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Six Months in the Machine Shop Field

Events of Interest to Machinery Men Since July, 1923

By K. H. Condit
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Business subsides somewhat from the levels reached during first half year—Conditions generally sound with promise for the future

THE OCCURRENCES in the machine shop world since July, 1923, the date of our previous review issue, have been overshadowed, even to the men who earn their living in the shop, by events of wider significance. To Americans everywhere and to many of other nationalities the untimely death of Warren G. Harding was a great shock. One of the best loved of our presidents, his inability to withstand the terrific strain of overwork forced upon him was keenly felt. The fact that his passing had such a slight effect upon the flow of business is a lasting tribute to his wisdom in insuring that his successor should be thoroughly familiar with the smallest details of administration policy.

Another calamity and one of far more serious results, was the earthquake that devastated the two greatest cities of Japan. Few Americans perished in the disaster but the loss to our Far Eastern neighbors was so appalling that the response to the appeal of the Red Cross for aid brought a speedy response. Probably nothing has done so much to improve the relations between the two countries as this quick offer of help in time of trouble. Many Japanese manufacturing plants suffered and there is a good possibility that some of the replacement orders for equipment will come here.

With the convening of Congress the yelping of the political bonus hounds rose in volume only to be silenced by the bombshell of the Mellon tax-reduction plan. Men prominent in industrial circles were prompt to declare that no other single thing would provide such a stimulant for business as tax reduction. The members of the political party responsible for the present inequitable income tax law have done their best to discredit the sound economic basis of the Mellon plan but with little success.

On top of the Mellon letter came President Coolidge's first message to Congress, eagerly awaited by men of all classes. It was hailed generally as a masterpiece of clarity and sound thinking and did much to strengthen confidence in the future.

During the last six months the coal commission finished its labors, made its report and passed into history As a result a mass of valuable data is available when the next dispute happens. Whether it will be used or not is another matter. Certainly little attention was paid to it when the anthracite strike was "settled."

An equally important event in industrial circles was the decision to put the steel industry on an eight-hour basis. Much recrimination and wild talk has centered about this old controversy and it is a pleasure to see it settled.

Rather disquieting have been two recent decrees in trade association litigation. The Cement and Tile Association cases are useful as showing the attitude of the Department of Justice toward the collection of business statistics so strongly urged by the Department of Commerce.

Developments in various fields of machine shop activity are told in the various reviews that follow. Some of the things not touched on but still of interest to the industry are the first installations of automatic train control systems and the doings in aviation circles. Americans have taken great pride in their big diri-

gible which was formally put into commission several months ago. She may be the harbinger of a new transportation or she may go the way of the ill-fated French Dixmude lost in a hurricane somewhere over the Mediterranean Sea. The Navy is apparently not concerned over the outcome as plans are well under way for the North Polar exploration trip next summer. In the realm of flight it is also interesting to note the records made by racing airplanes recently. Better than four miles a minute is a terrific pace and indicates how much the known world is shrinking in size if one measures by the time taken to get to one place from another.

The last six months have not been without their toll of men prominent in the industry. During this time the curtain has been rung down for many of our good friends leaving gaps that are hard to fill. Among the best known were: Howard E. Adt, Geometric Tool Co.; Daniel Best, Best Mfg. Co.; Thomas E. Brown, Otis Elevator Co.; Francis Fenwick, Fenwick Freres et Cie; Robert W. Hunt, R. W. Hunt Co.; A. J. Langelier, Langelier Mfg. Co.; Geo. Maclagan, Garvin Machine Co.; Waldo H. Marshall, Consolidated Machine Tool Corp. of America; Lewis H. Nash, Nash Engineering Co.; Gen. Wm. S. Peirce, Assistant Chief of Ordnance; Ralph Peters, Long Island R. R.; M. A. Potter, E. C. Atkins & Co.; Salmon W. Putnam, Fitchburg; John E. Snyder, J. E. Snyder & Son; Charles P. Steinmetz, General Electric Co.; Wm. F. Wendt, Buffalo Forge Co.; Edward M. Woodward, Woodward & Powell Planer Co.

Standardization Résumé

By P. G. Agnew
Secretary, American Engineering Standards Committee

Screw thread and gage committees present important reports—Government activity in standards work—Standardization abroad

EACH YEAR standardization plays a more and more important rôle in the development of industry. This is equally true whether looked at from the point of view of the factory, of the industrial or technical associations, or of a national movement.

More than 150 undertakings now have official status before the American Engineering Standards Committee, the national clearing house for industrial standardization. Fifty standards have received final approval by the committee, twenty-two of which were approved during 1923.

Of the 150 projects no less than twenty-seven are strictly mechanical engineering subjects, while fifteen are classed under the heading of Ferrous Metals and thirteen under the heading of Non-Ferrous Metals. A large number of the remaining projects are of interest to the machinery industry directly or indirectly.

The work of the sectional committee on screw threads has been completed and is now before the sponsors, the American Society of Mechanical Engineers and the Society of Automotive Engineers. The report has been published in nearly final form in the *American Machinist*.

Report on Gages and Fits

The report of the sectional committee on gages and fits has likewise been completed, and has been published for final public criticism. In its fundamentals, the work is in accord with the systems which have been adopted in Continental Europe, notably Austria, Holland, Germany, Sweden and Switzerland, although the various systems naturally differ in many details on account of prevailing shop practices in the respective countries.

It has been hoped that complete international uniformity might be brought about in three series of ball bearings, in order that they might be completely interchangeable. At a conference at Zurich, Switzerland, in July, representatives of the various national bodies interested met, and elaborated proposals as a basis for international agreement, which proposals are now before the respective national bodies.

The sectional committee on the standardization of shafting has reached agreement upon stock lengths, diameters and tolerances, and keys, stock sizes and tolerances. The sectional committee on bolt, nut and rivet proportions has reached agreement on the dimensions essential to wrench fits for bolts and nuts. This has been published by the American Society of Mechanical Engineers, and is available for general criticism.

Safety Codes and Industrial Standardization

One of the safety codes approved during the year, the Safety Code for Mechanical Power Transmission, which has been published by the American Society of Mechanical Engineers, is of particular interest to mechanical industries.

In the general field of industrial standardization, a particularly significant development is the increased systematic use of specifications in public purchases, notably in the federal and in several of the state governments. The National Association of Purchasing Agents and the National Council of Governmental Purchasing Agents are devoting much time and attention to the subject. At the direction of Mr. Hoover, the Department of Commerce is preparing to publish a "Dictionary of Specifications for Public Purchases," which will make easily available information as to what specifications are in existence, to what classes of use they apply, and how they may be obtained.

The Division of Simplified Practice of the Department of Commerce continues to exert a most stimulating influence on the standardization movement, particularly in emphasizing the efficiency results of standardization to the business man.

In July, the second conference of the national industrial standardizing bodies was held in Switzerland, where thirteen of the more important industrial nations of Europe and America were represented. Important progress was made in developing co-operation between

the various national bodies, particularly in regard to the early release to each other of information on work in progress. Information on the status of all projects in hand is now regularly interchanged between the various bodies. Provision was made for continuing the work of the conference on the many problems of common interest through a continuing loose-knit organization.

The extensive standardization work going on in Germany continues to present many interesting phases. Some of these were outlined in a recent bulletin of the American Engineering Standards Committee. The German work is particularly interesting to the mechanical engineer, since, like most of the Continental work, it is largely dimensional. Practically every important manufacturing concern in that country is actively engaged in the work, and more than a thousand companies have formal standardization organizations within their own works. Approximately seven hundred national German standards have been approved by the central national standardizing body. These are only standards in which several industries are concerned. Standardization engineering is now a recognized profession in Germany. Some of the consulting engineering firms specialize on standardization work. Through their work on trade catalogs, these consulting engineers, among other things, are introducing standardization into sales policies and sales organizations.

American Railroads in 1923—and in 1924

By Robert S. Binkerd
Vice-Chairman Committee on Public Relations of the Eastern Railroads

Record year for railroads—Commendable reduction in bad order equipment—New facilities—Fair play from Congress

NINETEEN-TWENTY-THREE has been a great railroad year. Not since long before the war has so much progress been made. The year has been marked by the greatest traffic yet known; by the highest degree of operating efficiency yet achieved; by the greatest increase in new facilities for the past ten years; by the beginning of substantial new construction, after a lapse of almost eight years; by improved co-operation with shippers; and by substantial improvement in earnings, in labor relations, and in public relations.

While figures for the month of December are not yet available, it is expected that car loadings for 1923 will amount to nearly 50 million cars. The previous record was approximately 45 million cars in the year 1920. The increase in ton-miles of transportation will probably be around 4 per cent.

By a sustained and concerted effort the railroads have reduced their locomotives in need of heavy repair below 15 per cent, and their cars in need of heavy repair to approximately 5 per cent, standards of maintenance which have not been approached since before the war.

For the first eight months of the present year the railroads succeeded in getting a transportation service of 511 ton-miles out of each freight car each day, as against 388 ton-miles per car last year—an increase in the effective use of the unit of transportation of over 31 per cent.

Large Provision for New Facilities

The present year has been marked by the largest provision of new facilities in the past ten years. Up to Dec. 1, 177,845 new freight cars and 3,704 new locomotives had been put in service, and there were still on order 36,789 new freight cars and 739 new locomotives.

During the years 1922 and 1923 combined, the railroads committed themselves to the purchase of 300,984 freight cars and 5,822 locomotives, at a cost of over one billion dollars. This year they have also been engaged in additions and betterments to fixed property, estimated to cost over 600 million dollars.

Despite the fact that there had been no general rate reduction this year, there has been a process of transition and gradual readjustment of individual rates, largely downward.

These changes represent the voluntary effort of the railroads to remove the maladjustments caused by the application of horizontal rate increases, during and immediately following Federal control.

It is interesting to note that in 1921 the railroads received an average revenue per ton-mile of 1.275 cents; in 1922, 1.177 cents; and for the first nine months of last year, 1.108 cents.

Railroad Earnings Begin to Approach Figure Named in Transportation Act

For the first ten months of this year the railroads earned approximately 821 million dollars, or about 5.2 per cent on the Interstate Commerce Commission's tentative valuation, plus subsequent investment to the first of this year. It seems probable that net operating income for the year will amount to somewhere around 975 million dollars, or about a 5 per cent return on the above base, which does not include compensation to new railroad capital invested during 1923.

While these earnings are still inadequate, when it is considered that the railroads had practically no earning power in 1920, progress in restoring that earning power during the past three years represents a substantial and hopeful achievement.

Fair play toward the railroads will enable them to improve upon the fine service rendered this year, and to continue to function during the coming year as widespread distributors of business and employment. Unfair treatment, on the other hand, will necessarily result in diminution of these activities, and will be felt by both employes and employers in many other industries. Everyone can appreciate that new projects and large expenditures cannot be authorized with the possibility of confiscatory legislation constantly hanging over the railroads. Railroad men are putting their faith in the American spirit of fair play.

Excellent Late Summer and Fall Business in the Automobile Industry

By Alfred Reeves
General Manager, National Automobile Chamber of Commerce

Seasonal reduction in production much less than usual—Total production over 4,000,000—Developments in the commercial field

CONTINUING from month to month to set up new production records for each period of the year, the automobile industry in the last half of 1923 exceeded the expectations of many analysts. Some thought that the high peaks reached in the early part of the year would lead to extremely dull business in the later months. This, however, did not turn out to be the case. While no subsequent month reached the totals of April, May and June, yet the seasonal decline was very slight.

There were, for instance, 365,000 motor vehicles manufactured in October, as compared with 382,000 in April, 392,000 in May and 377,000 in June.

The total output for the year will be in the neighborhood of 4,000,000. As this article is written in the last week of December, reports indicate that the figure will be 4,014,000.

The truck market has been holding up well for this season likewise, with a production of 30,166 in October.

As the year draws to a close, there are several factors which stand out. In the first place, it is interesting that the U. S. Bureau of Public Roads estimates at this time indicate a registration in the neighborhood of 14,500,000. This is an increase in the neighborhood of 2,300,000 vehicles and indicates the intensive use and active demand for motor transportation in many lines.

Not only are new families buying cars and moving out into the suburbs, but there is a growing practice of having a business car for the husband and a car for shopping and social use by the rest of the family.

The buying of fleets of motor cars for salesmen, supervisors and executives is becoming general in the business world.

In the exclusively commercial field there has been a marked development during the year, especially in the operation of motor buses and motor trucks by public utility companies. We find 107 street railways operating motor buses at the beginning of 1924, as compared with 56 at this time last year; and 157 railroads are using motor vehicles with flanged wheels for short routes, as compared with 40 lines of this type a year ago.

Some Research Achievements of 1923

By William Spraragen
Secretary Division of Engineering, National Research Council

Work of the National Research Council—Developments in fatigue, hardness and heat treatment research work

THE DIVISION of Engineering carries out the general purpose of the National Research Council in the field of engineering by stimulating research and co-ordinating the work of existing agencies. Education of managers to the appreciation of the necessity of research and co-ordinating of scientific attack involving large problems, especially those which depend for successful solution on the co-operation of many workers and laboratories, may be numbered among its activities.

Some of the projects connected with the Division which are of interest to the metal industry are given below:

Research into Behavior of Metals

Fatigue Phenomena of Metals. Fatigue failures occur in shafts of steam turbines, electric generators and motors, and airplane engine crankshafts and axles of railway cars, automobiles and trucks, and in many machine parts. Fundamental laws and engineering data for the guidance of engineers and manufacturers in selecting materials, making designs and choosing methods of manufacture and operation are sought. Successful procedures for tests have been learned and several important conclusions drawn in connection with wrought ferrous metals. Study is now being made on the fatigue properties of the non-ferrous group. About $50,000 has already been expended and approximately $20,000 is still available. Manuscript for a third bulletin is nearly completed.

Hardness Testing of Metals. Progress is being made in the measurement of various hardnesses or combinations of properties with the hope that certain combinations will give indication of the behavior in practice of a piece of metal under consideration. A number of important papers have been published.

Heat Treatment of Carbon Steel. A report has been published on the investigations covering the effect of time, temperature and rates of cooling on physical properties of three different kinds of steel most used in engineering work.

Molding Sands. The purpose of this committee is to bring about economies in iron and steel and non-ferrous foundries through the reuse of molding and

core sands and to investigate methods of testing and selection of sands for specific purposes. Economies have already been brought about through the reclamation of used sands in one of the larger non-ferrous foundries. Samples have also been collected by State Geological Surveys, which will be tested and which will probably bring to light new useful sand deposits.

Welding. The activities in the welding field (which are described in greater detail eleswhere) brought about an extension of the use of welding with a resulting saving to the nation of many millions of dollars.

Among other projects of the Division of Engineering are included those on Marine Piling, Electrical Core Losses, Insulation, Neumann Bands, Pulverizing, Uses of Tellurium and Selenium, Relation of Quality and Quantity of Illumination to Efficiency in Industries, and Highways. The results of the last named investigation have already brought about savings of many millions of dollars in highway construction. In the case of the Marine Piling Investigations widespread destruction caused to marine structures by borers, and more particularly the $20,000,000 damage in San Francisco harbor, necessitated the Council undertaking a scientific investigation. Co-operation was offered by the Army, Navy, Chemical Warfare Service and other Governmental departments, university of laboratories, industries and others. A final report will be issued shortly.

Progress in Machine Tool Industry in 1923

By Ralph E. Flanders
President, National Machine Tool Builders' Association

Business better than in 1922 but still slow—Sources of business—Second-hand market—A look ahead

ON LOOKING back over the machine tool business for 1923 it seems evident that although production was on a low scale and was quite irregular it was better than during either of the two years preceding. The peaks of machine tool curves for all lines were reached during March. The balance of the year demand fluctuated. In some lines there were upward turns and in the others the downs predominated. Taking business as a whole it was on a distinctly lower plane.

Practically all the war equipment of machine tools has been absorbed but new business is still hampered by sales in the second hand market of occasional blocks of used machines. Quite a few completely equipped plants have been sold at auction.

When we review the sources of business of the year there is no question but that the automobile industry has been the biggest purchaser. Expansion business has been practically confined to one large enterprise, the remaining tools sold going to replace obsolete and worn out equipment or to fill certain needs in existing plants. More railroad business has been placed than for many years past and there has also been a very fair business from electrical manufacturing industries. Sales to the general manufacturing shops have been rather slow while foreign business has been almost negligible although rather better than during 1921 and '22.

Developments in Special Tools

The slacking of machine tool business has naturally resulted in the bringing out of some new developments. It is probably sufficient for me to say that the principal activity seems to have been along the lines of highly specialized machines such as automatic lathes. An outline of the developments for the last six months will, of course, be found in the section devoted to such things in this issue.

The prospects for the coming year are not very clear. No expansion is expected in the automobile industry but if production continues at the present rate there should be a fair volume of replacement in the improvement business. No matter how large this is, however, it could be made larger to the great benefit of the manufacturers. There is no boom in the truck and tractor field as was expected three or four years ago, but steady business continues. The end of railroad buying is not yet in sight although it is quite possible that sales may not reach the total of those for 1923. If general business continues on the scale of last year there should be a better market for machine tools in the shops that are usually classified in this group. One very favorable factor is the sternly restrictive immigration policy that is evidently to continue. This is steadily cutting down the supply of unskilled labor and making it essential that the work be done by machinery instead.

Boom Generator Not in Sight

Unfortunately there are at the present time no new large fields of manufacturing in sight such as have been furnished successively by railroads, bicycles, automobiles, ordnance, etc. Some people have hoped that the airplane would be the cause of the next large boom but it does not seem to have reached the stage of rapid expansion as yet.

New foreign markets are possibilities of the future. Europe may furnish a somewhat increasing outlet and the settlement of the Russian troubles would certainly mean a much larger one. Future possibilities of the Orient are attractive but still vague and formless.

India, we are told, is undergoing a transformation from hand to machine production of many commodities. Her natural source for machinery would be England, however. China is in the usual difficulties of revolution and political turmoil. Japan is striving to rebuild after the earthquake but is more interested just now in building materials than in machinery although machinery orders may come in later.

Prospects for 1924 cannot be summed up better than in the prognostication of Mr. Kearney, retiring president of the Machine Tool Builders: "Business for 1924 will be neither good nor bad."

Six Months with the Gear Manufacturers

By George L. Markland, Jr.
President American Gear Manufacturers' Association

Commercial gear men busier than makers of automotive gears —Tendencies in gear design—Effect of the Gear Association

THERE has been considerable pessimism as to business conditions generally by the same pessimists of years' standing. But some of the rest of us who are more optimistic find that textile manufacturers are overhauling and repairing for coming business, as are many other lines.

There is this feature in the gear business—herringbone gears are being more generally used, and the speed reducing unit is greatly in demand. While there are many calls for the spur and herringbone speed reducing units, the worm gear unit is steadily gaining in favor, due perhaps to the improvement in tooth form and increased pressure angle. There is, however, the danger in producing the worm gear unit that unless there is a complete equipment in hobs and proper machines, the worm gear unit may fall into disrepute, due to faulty tooth form and general construction of the unit.

Where spur gears are concerned, there is a very marked tendency to the use of a 20-deg. pressure angle full tooth, involute of course, with the stub tooth somewhat in favor for heavy service. This same condition is true where herringbone gears are used.

There is a persistent demand in increasing volume for the spiral toothed bevel gear, and I have concluded this form of tooth in bevel gears for general use is a very much more serviceable gear, as well as practically noiseless.

Since the introduction of cotton fabrics in gear materials the demand for pinions of micarta, textoil, etc., has reached a considerable volume, although rawhide is still used.

So far as I can discover, the gear manufacturers producing automobile gears are very dull, while the commercial branch of the gear industry is quite busy. Judging by the kind and volume of business we are getting, I believe we shall have a continuation of good business throughout the coming year.

There is a different atmosphere in the gear business since the formation of the American Gear Manufacturers' Association some seven years ago. The gear consumer has been educated to a more critical frame of mind, and the gear manufacturer has learned the value of standardization in our line, although we might say the surface has only been scratched in this matter of standards. Yet the quality of gear, as to tooth and material, has greatly improved. The gear with cast teeth is slowly passing. It may have its uses, though I can see no excuse for it since the gear with cut teeth lasts much longer and is produced at a not very considerable increase in cost.

Electrical Industry Has Banner Year

By Robert M. Davis
Statistical Editor, *Electrical World*

Record output of power by central stations—Hydro-electric projects large—Manufacturers busy—Future developments planned

STATISTICALLY and economically the year 1923, just closed, stands out as the greatest year in the history of the electric light and power industry. Not only did the industry report record output and revenue figures, but the increase over the previous year is by far the largest ever recorded.

Based on operations reported for the first ten months of the year, it is estimated that a total of 66,800,000,000 kw.-hr. of electrical energy was sold by the industry during 1923, which is an increase of 26.4 per cent over 1922, 52.0 per cent over 1921, the year of industrial depression, and 46.2 per cent over 1920, the peak year of post-war industrial activity.

Throughout the electrical industry the year 1923 was characterized by a record volume of production in practically all classes of apparatus, exceeding in many cases the maxima of wartime output. The demand for electrical apparatus showed seasonal irregularities but manufacture proceeded almost uniformly at a high rate.

High pressure production is not usually conducive to radical changes in design and a considerable proportion of the improvements made were along conventional lines.

The hydro-electric projects now under actual construction under licenses from the Federal Power Commission involve a proposed ultimate installation of 2,339,010 hp., and the cost of these developments is estimated at $207,805,150. The horsepower of these projects scheduled to be put in operation in 1923 is 186,010 and in 1924, 260,780. Thirteen of the twenty-nine projects under construction are in California.

It is estimated that in 1933 more than one hundred and twenty-five billion kilowatt-hours of electrical energy must be generated by the central generating plants of the country to meet the demands of customers for electrical service in the home, on the farm and in the mine and factory. To meet this demand the central-station generator rating must be increased by 32,418,000 kva., involving an expenditure of more than six billion dollars.

Recent Developments in Welding Methods

By William Spraragen
Secretary, American Bureau of Welding

Arc welding of steel structures—Arc and gas welding of tanks and pipe lines—Improvements in machines

THE GENERAL application of the various welding processes has nearly trebled during the past few years. This extension is partly due to the increased familiarity of industrialists with the possibilities of welding and the resulting advantages accruing both in economy and quality as compared with riveting and partly to the improvement in materials, apparatus and methods used in these several processes.

Information has been compiled on the applications of arc welding to steel structures. A number of tests have been made to determine the shearing strength of arc deposited metal. Indications are that it will be possible to construct a welded truss which will show a saving in weight of over 15 per cent as compared to the riveted process for the same loading and span. Many large structures including ships, gasholders, frame work of buildings, etc., have been fabricated by this process.

The possibilities of the use of a special alloy nickel-steel electrode to obtain a 100 per cent weld in mild carbon steel without the use of a greater cross section of deposited metal has been tried out in an experimental way with considerable success.

Improvement of arc deposited metal by forging is also being investigated. Preliminary tests have shown that it is possible to improve arc deposited metal by forging to such an extent that it will withstand nearly double the fatigue stresses of the ordinary steel plate. By forging and heat treatment it has been possible to obtain welds in chrome vanadium steel having an ultimate tensile strength of 132,000 lb. per square inch. By the use of special coated nickel-steel electrodes it has been possible to obtain a depth of penetration sufficient to satisfactorily weld abutting $\frac{3}{8}$-in. plate without scarfing of the edges, one layer being deposited on each side of the seam.

Electrodes for Welding Cast Iron

New electrodes have been developed for welding cast iron including a special copper-nickel alloy wire which has the properties of welding cast iron cold without the use of studs or annealing. The resultant welds may be machined as easily as carbon steel.

A special self-fluxing copper alloy wire has been developed for arc welding copper bonds to steel rail with remarkable success. A satisfactory weld has thus been made possible between steel and copper. The action of fluxes on welding wires is better understood and appreciated. New developments may be expected in this field.

Standards for arc welding apparatus have been prepared including information on classification, definition of terms, rating, tests, etc. Standards and specifications have also been drawn up for welding wire and training of arc welders.

The welding of oil pipe lines is now becoming common practice. A successful recent example was the welding in Texas of a 140-mile, 8-in. line carrying 750 lb. oil pressure. A number of water, steam and oil lines have been successfully gas welded during the past year. Exacting requirements for oil pipe line work involve not only the development of engineering standards to insure sound mechanical welds under trying conditions out in the open country, but also the solution of the management question—the distribution of materials and organization of mobile crews to handle the work.

Welding in the Oil Field

Two 1,000-bbl. oil storage tanks have been welded and are now in service. The results indicate that the tanks are oil tight. Specifications have been drawn up for the welding of 5,000 bbl. tanks for lighter oils.

Oxy-acetylene welding under a nitrogen atmosphere has been successfully accomplished. The particular application which necessitated development in this direction was the prevention of magnetic oxide formation within a welded transformer tank.

Progress in electric resistance welding during the past year has been more in the quantity of application of the process with known apparatus than in any radical departure from existing methods. In the butt welding field the chief advance has been in the replacing of steel castings or complicated machine parts by either drop forgings or steel stampings in halves welded together by the resistance method.

The tendency lately has been in making welding machines as nearly automatic as possible. Heavy work requires heavy pressures ranging from 2,000 to 10,000 lb. per square inch to complete the weld. A power-driven automatic welder does not grow weary as does the manual operator and when once set for pressure, current and cutout, the apparatus functions continuously in exactly the same manner making all welds identical and leaving the operator free to handle the work only.

A new and interesting application of seam welding has been the development of a welder for seam welding of ends of 1/100x8 in. steel sheets together in one continuous sheet. The sheets are run through a multiple slitter which cuts them into strips or ribbons $\frac{1}{4}$ in. wide. These ribbons are then woven into very handsome inexpensive fruit baskets.

Standards have been prepared for resistance welding transformers, equitable to the user, central station and manufacturer.

A resistance welding nomenclature report defining the terms most commonly used in this field has been drawn up by a committee of the bureau.

Developments during the past year have been in improvement of methods of application particularly in the economies brought about in the saving of the amount of thermit used without sacrificing the quality of the weld. A notable example is the application of Thermit welding of rail joints where a saving of about 50 per cent has been effected.

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KENNETH H. CONDIT AND FRED H. COLVIN

Editors

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Tax Revision Plans in the Open

IT IS fair to assume that by this time the interested citizens of the country have studied the Mellon tax-reduction plan and understand its provisions. The Democrats have come out with their substitute plan and it has received wide publicity. And finally the so-called radical group has made its offering. It is now up to Congress to choose which plan to make into law and up to constituents all over the country to advise their representatives what to do.

It seems to us that it is about time to drop the term "radical" as applied to any group that will sponsor any such plan as that put forward in last week's daily newspapers. If anything can be more reactionary than the attempt to play politics by advocating tax reduction while attempting to saddle the taxpayers with a tremendous added expense we have yet to hear of it. It certainly sounds like politics of the most old-fashioned type.

As to the attacks on the Mellon plan that have been circulated freely during the last fortnight they seem to have found ready refutation at the hands of Mr. Mellon himself. The Secretary's position is hard to shake because he backs up his theories of taxation by cold figures in dollars and cents. His reply to the senator from Michigan in which he showed that an insider like the late W. G. Rockefeller put six-sevenths of his money in tax-exempt securities and only one-seventh in Standard Oil issues, admittedly among the best dividend-paying industrials, is unanswerable.

The recent swing of sentiment away from the bonus and toward the Mellon plan has begun to have its effect upon the members of Congress who keep a keen ear to the ground for the first murmurs of change in public opinion. As a result it seems likely that action of some kind on tax revision will come soon.

Reducing the Amount of Spoiled Work

AT THIS season of the year when new resolutions are supposed to be in order it may be timely to suggest a thought on the question of scrap or spoiled work. There is nothing more disheartening to a production manager than to find a perfectly good piece of metal, which may represent considerable value in itself, rendered worthless by a mistake as it nears completion.

It is not enough to blame the operator, the fault may easily be elsewhere. The instructions may not be clear, the machine or tools may not be in good condition or the gages may be worn. But it matters little what the reason *after* the work is spoiled. The real task is to prevent its being scrapped through any cause within the control of the shop.

Some plants, to be sure, have reduced their spoiled work to what seems to be a low point. Less than two per cent sounds very little indeed. But with a large output this may easily total up to a sum that seems almost criminal to contemplate.

No one who knows either human nature or machinery, expects to get one hundred per cent production. There will always be some waste due to misunderstanding, inefficiency and pure carelessness. But there are few shop problems which will pay better returns than a careful study of the work spoiled and methods by which much of this waste can be eliminated. Just as "a penny saved is a penny earned" so is a piece of work saved instead of spoiled, an addition to the next dividend.

The Future of the Automobile Industry

IN A recent public address Charles M. Schwab expressed the opinion that the future of the automobile industry is as bright as was that of the steel industry in 1900. Considering the fact that 17,000,000 tons of steel were produced annually at that time and 40,000,000 tons last year, his prediction may fairly be considered optimistic.

Mr. Schwab is not blind to some of the problems facing the industry. He mentioned the unduly high cost of distribution as compared to manufacturing cost and intimated that something must be done to strike a balance. No one who is familiar with actual figures on these two items in the automobile selling price will disagreee with him. The 1913 dollar buys a lot more automobile than it does of many other things but it would buy still more if distribution costs could be sharply cut.

Defective Eyesight as a Cause of Waste in Industry

HOW MANY men are endangering themselves and those around them by trying to hold down jobs for which their poor vision makes them unfitted? In the Ford plant at Detroit, 29,000 out of 60,000 examined were found to have defective eyesight. As a result of the examination and subsequent study those with poor vision were shifted to jobs where their misfortune would not be a handicap to them or a menace to their associates.

Similar work has been undertaken by E. I. du Pont de Nemours Co., and has been productive of very satisfactory reduction in industrial accidents. This company has also made a careful study of illumination problems and keeps a careful check on developments in the different plants so that there can be no backsliding.

The Eyesight Conservation Council from whose report these instances were taken is conducting a survey of eyesight conditions in American industry. The survey is an outgrowth of the Waste in Industry report of the Hoover committee of the Federated American Engineering Societies.

American Machinist Shop Equipment Review

Semi-annual résumé of machines, tools and accessories described in the Shop Equipment News section of the American Machinist during the last six months of 1923

Principal Developments in Shop Equipment

By L. C. Morrow
Managing Editor, *American Machinist*

DURING the second half of the year 1923 developments followed closely the trend outlined in the first "Shop Equipment Review." The automatic feature has continued to grow. Grinding machinery has come forward rapidly, the grinding of gears receiving especial attention. A remarkable number of machines for handling materials has been placed on the market. The policy of fitting the machine to the job has been adhered to, and so has the principle of reducing the work of handling the machine.

Thirty grinding tools were introduced during the twenty-six weeks of the last half of the year—more than one per week. They run from the floor and bench types of tool grinders to the heavy surface, disk and cylindrical machines. Research work in connection with gears, and the demand for smooth and quiet running have influenced the development of three gear tooth grinding machines of note. Other developments included four surface grinders, a disk grinder, a face grinder, a centerless grinder that will grind shoulder work, three drill grinders, and two vertical machines—a cylinder and an internal grinder.

Drilling and boring equipment ranks second in number of developments. The multiple-spindle design predominated in both the vertical and horizontal types. The influence of the automobile shops can be seen in that the machines are made for production purposes, although few are limited to automotive work.

Materials handling equipment has kept pace with production equipment, the devices offered including no less than eleven industrial trucks and portable cranes. The maintenance truck, also, made its appearance.

Gain in Automatic Operation

Automatic and semi-automatic operation continues to be incorporated in design. During the past six months there have been introduced in the automatic class an unusual chucking machine, an automobile hub machine, a gear grinder, a duplex rotary surface grinder, a screw-slotting machine, a screw-driving machine, a threading machine, a disk grinder (semi-automatic) and a bench miller (semi-automatic). Improvements have been made on other automatic machines, and automatic features added to still others. On the whole, automaticity has gained, with indications that still further developments will be made to lower labor costs and selling prices.

The railroads are an important market for machine tools of both standard and special types. Several machines were designed for railroad work especially, notably a car wheel lathe, a block slot milling machine, a switch planer, and a combination radius, internal and surface grinder. It seems that there is a good general appreciation of the fact that as the country grows, so must the railroads, and that therein is a potential as well as present market for machine tools, not only of special, but of existing designs. Before the railroads can command in the way of special machinery an amount of attention at all comparable to that given to the automotive industry, they must show their willingness to use modern equipment and production methods, both of which are applicable in railroad work. The slow process of education must precede radical changes from the tools as now designed for railway repair work.

Lathes were represented during the latter half of 1923 by nine developments, which introduced refinements and specialties such as friction back gears, apron control, taper turning, portability, back gears beneath spindle, and driving mechanism below spindle.

Planing, Sawing and Welding Developments

Planers and shapers offered included a planer known as the "twin-rail, long reach," another of the open-side type with three rails, a shaper emphasizing the balanced ram feature and a shaper with speed and driving gears within the column and the feeding movement actuated by cam.

In metal-sawing machinery, the shaping, gap, and bench saws, a hacksaw and a bench saw prove that this necessary and important operation has not been overlooked.

Three spot welders were developed. It is probable that greater impetus will be given the design of welding machinery as knowledge grows concerning the value of welding as a production as well as a repair process.

Certain machines for performing operations on gears have been mentioned. Others coming under the scope of this review are a bevel gear generator, a spur and spiral gear hobber, a spiral gear hobber, a spur gear hobber, and a gear tester.

Small tools and instruments experienced normal development.

A machine that can be applied to drilling, reaming, tapping, boring, turning, milling, and other operations, for the rapid production of automobile parts and similar work may be taken as an indication of the kind of specialization in design now finding favor. It seems probable that a number of machines, that may be said to belong to the "production" class, will be announced during 1924.

Contents of the Review Pages

	No.	Page
Boring Machines	**1–5**	**83**
Horizontal	1–2	83
Jig	3	83
Vertical	4–5	83
Drilling Machines	**6–23**	**83**
Upright	6–11	83
Sensitive	12	84
Multiple-Spindle	13–17	84
Electric Portable	18–20	85
Rotary	21	85
Horizontal	22–23	86
Gear-Cutting Machines	**24–26**	**86**
Bevel Generator	24	86
Hobbing Machines	25–26	86
Grinding Machines	**27–55**	**86**
Centerless	27	86
Disk	28	87
Face	29	87
Gear	30–32	87
Internal	33–35	87
Surface	36–40	88
Tool and Cutter	41–47	89
Portable	48–49	89
Attachments	50–55	90
Lathes	**56–74**	**90**
Engine	56–61	90
Bench	62–63	91
Turret Lathes and Screw Machines	64–68	92
Chucking	69	92
Special	70–71	92
Attachments	72–74	93
Milling Machines	**75–76**	**93**
Bench	75	93
Wedge Block	76	93
Planers and Shapers	**77–82**	**94**
Planers	77–79	94
Shapers	80–82	94
Presses	**83–87**	**94**
Broaching, Assembling and Straightening	83–86	94
Forging	87	95
Threading Machines	**88–94**	**95**
Tapping and Threading	88–91	95
Thread Milling	92	96
Pipe Threading	93	96
Attachments	94	96
Other Machine Tools	**95–107**	**96**
Buffing	95	96
Die-Sinking	96	96
Engraving	97	96
Filing	98	97
General Purpose	99	97
Lapping	100	97
Nibbling	101	97
Sawing	102–105	97
Screw Slotting	106	98
Swaging	107	98

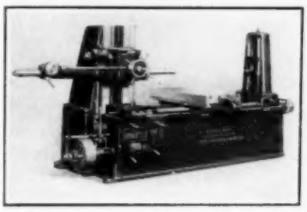
	No.	Page
Other Machines	**108–126**	**98**
Baling	108	98
Bending	109–111	98
Burnishing	112	99
Cleaning	113	99
Die Casting	114	99
Hammers	115–118	99
Pipe Cutting	119	100
Sandblasting	120	100
Screwdriving	121–122	100
Shearing	123	100
Welding	124–126	100
Measuring, Gaging and Testing Equipment	**127–148**	**101**
Micrometers	127–130	101
Gage Set	131–132	101
Dial Indicators	133–135	101
Indicating Gages	136–140	102
Snap Gage Equipment	141–142	102
Balancing Machines	143–144	103
Gear Testing Machine	145	103
Material Testing Machine	146	103
Speed, Time and Temperature Indicators	147–148	103
Material Handling Equipment	**149–166**	**103**
Trucks	149–159	103
Tractors	160–162	105
Cranes and Hoists	163–166	105
Woodworking Machinery	**167–171**	**106**
Boring	167	106
Surfacing	168–169	106
Sawing	170	106
Combination	171	106
Small Tools	**172–191**	**106**
Hand Tools	172–177	106
Cutting Tools	178–184	107
Tool Holders	185–187	108
Miscellaneous	188–191	108
Miscellaneous Equipment and Supplies	**192–219**	**108**
Roller Bearing	192	108
Power Transmission Equipment	193–200	109
Materials	201–203	109
Electrical Equipment	204–206	110
Pumps	207–209	110
Heat-Treating Equipment	210–211	110
Foundry Equipment	212–213	111
Standard Pins and Bushings	214	111
Solder Pot	215	111
Truck Cleaner	216	111
Nut Lock	217	111
Time Study Board	218	111
Fiber Protectors	219	111

Boring Machines

—1—

Boring, Milling and Drilling Machine, Horizontal, Cleveland. *Sommer & Adams Co., 18511 Euclid Ave., Cleveland, Ohio.* [A.M.,vol.59,p. 534.]

The manufacture of this machine was recently taken over by the above company and several improvements have been made. The column has been made wider at the

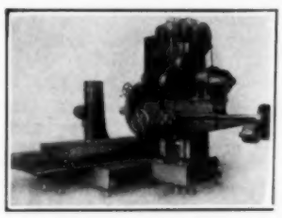


base and heavier throughout. The bed is of the deep box type and no special base is required. A series of 12 spindle speeds are available, ranging from 10 to 150 r.p.m. with a drive pulley speed of 240 r.p.m. Sixteen feeds are provided from 0.005 to 0.333 in. per revolution of spindle. The spindle is 2½ in. in diameter, has a No. 5 Morse taper and can be traversed through a distance of 23 in. The outer support can be removed when not in use.

—2—

Boring Machine, Horizontal. *Beaman & Smith Co., Providence, R. I.* [A.M.,vol.59,p. 970.]

This machine is built in five spindle sizes, varying from 3 to 8 in. in diameter. The feeding length of the 8-in. spindle is 4 ft., and eight feeds are available. Ball bearings support the spindle end thrust, and the quill is mounted in taper bearings.

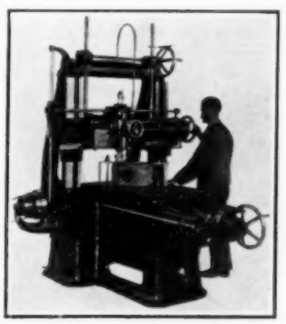


The quill carries the 4-ft. driving gear, which is driven from a motor mounted on the head. A geometrical series of spindle speeds from 1¼ to 80 r.p.m. is provided. The saddle is mounted on the column, on which it is arranged to slide vertically, and is counterweighted. It has hand and power feed and rapid power traverse. The work table is 4 ft. wide and 10½ ft. long and is mounted upon ball bearings. The bed for supporting the table is nearly twice as long as the table and can be adjusted to bring the work close to cutters attached to the faceplate gear. There are four motors on the machine; one for raising and lowering the head; one for driving the spindle; another for the quick power traverse of the spindle; and a fourth for operating the table.

—3—

Locating and Jig-Boring Machine, Societe Genevoise. *R. Y. Fermer Co., 1410 H St., N. W., Washington, D. C.* [A.M.,vol.59,p.385.]

These machines are built in four sizes of which the largest, No. 5, is shown in the illustration. A work carriage is moved by a precision screw along accurate ways and a cross-slide is similarly moved at right angles to the direction of motion of the work carriage. This slide may be fitted with a center punch for accurate layout, a drilling tool for the preliminary drill-

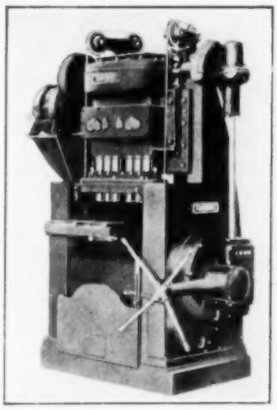


ing of holes or a boring tool or finishing end mill for cutting holes accurately to size. A microscope may also be used to check positions on the jig or, by means of a standard scale, to check the accuracy of compensation of the screws. An automatic device which shifts the zero points of the verniers, compensates for the inaccuracies of the screws and is a feature of the machine. Exceptional accuracy is claimed for these machines. The cutting tools are driven by means of a flexible shaft. A goniometric microscope is supplied with some sizes for measuring angles.

—4—

Boring Machine, Multiple-Spindle. *Foote-Burt Co., Cleveland, Ohio.* [A.M.,vol. 59,p.532.]

This machine is for use in boring and reaming automotive cylinders, and is intended for production work. The spindles are set on fixed centers and speeds and feeds are worked out to suit the job in hand. The main driving shaft in the head drives the spindles through worm and spur gearing, all gears and bearings being oiled by a force-feed system. The head is



stationary and the feeding is done by raising the work table. Four feeds are available by means of change gears. An automatic stop for disengaging the feed at a predetermined point is provided. The table can also be fed by hand.

—5—

Boring Mill, 8-Ft. *Cincinnati Planer Co., Cincinnati, Ohio.* [A.M.,vol.59, p.971.]

The table of this machine is driven by a bevel pinion which meshes with a large gear bolted underneath the table. The upper spindle bearing is made adjustable to compensate for wear. The drive gear box provides four speed changes when a variable speed motor is used, a nine-speed box being furnished for use with a constant speed motor. The motor is mounted on the gear box and geared to the drive shaft, and the change levers are conveniently located at the side of the operator. The heavy housings are bolted and tongued to the base and are firmly braced. The feed and rapid traverse are controlled from the side of the head for convenience and sensitive han-

dles are provided for setting the tools. Eight feeds are provided by a tumbler arrangement in a gear box. The rail is raised and lowered by an elevating device driven through positive clutches, and in which a friction clutch is incorporated for safety.

Drilling Machines

—6—

Drilling Machine, Upright, Ball-Bearing. *Aurora Tool Works, Aurora, Ind.* [A.M., vol.59,p.191.]

The built-in construction of this machine is its main fea-

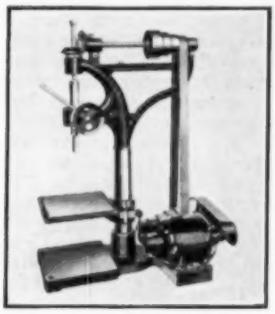
ture, as all moving parts with the exception of spindle and feed rod are enclosed. The speed box shaft speed is 450 r.p.m. All speeds and feeds are plainly designated and may be obtained without stopping the mechanism. Two sets of back gears are built in and, in combination with these, the speed box will give 16 spindle speeds ranging from 37 to 500 r.p.m. There are six feeds from 0.007 to 0.046 in. per revolution of spindle. The spindle has a No. 4 Morse taper, and the head has a vertical movement of 24 in. Ball bearings are used throughout the machine except in the quill, and all bearings and gears are arranged to run in oil.

—7—

Drilling Machine, Bench, Heavy Duty, Motor-Driven. *The Burke Machine Tool Co., Conneaut, Ohio.* [A.M.,vol. 59,p.197.]

The construction details and general features of this motor-driven machine are exactly similar to the belt-

driven machine described previously on page 499, vol. 58. The base has been enlarged to provide a base for the ½-hp. motor, which drives the countershaft through a Morse

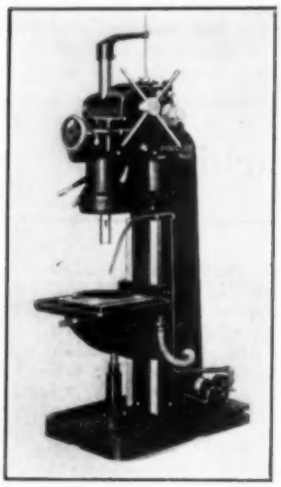


silent chain. A suitable guard for chain and sprockets has been provided. Motors can be furnished for either direct or alternating current.

— 8 —

Drilling Machine, No. 9. *Minster Machine Co., Minster, Ohio.* [A.M.,vol.59,p. 341.]

All the drive and feed gears of the machine are enclosed in the head housing at the top of the column. The drive shaft may be fitted either with tight and loose pulleys, single pulley with single friction clutch or single pulley with double-throw clutch. Four speeds are avail-

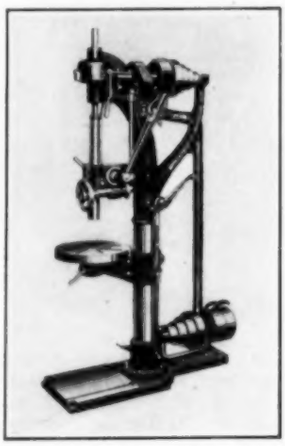


able from 73 to 550 r.p.m. and four feeds from 0.006 to 0.159 in. per rev. of spindle. The spindle construction allows 15 in. feed length and an adjustable stop can be set to stop the feed at any point. The spindle has a No. 4 Morse taper and is located 10½ in. from the face of the column. A 16x16-in. plain table with a vertical movement of 15½ in. is provided and a compound table can be furnished. The net weight with plain table is 2,065 lb., and drills up to 1½ in. in diameter can be handled.

— 9 —

Drilling Machine, Geared, 21-In. *Buffalo Forge Co., 490 Broadway, Buffalo, N. Y.* [A.M.,vol.59,p.491.]

This machine is similar in design to the 25-in. size described on p. 39, Vol. 51, the noticeable departures being the use of a positive gear feed and a frame brace between the lower pulley shaft and the upper part of the frame. Three power feeds are



available and can be obtained without stopping the machine. The spindle has 12½ in. vertical travel, the maximum distance from the spindle to the base is 39 in., and from the spindle to the table, 22 in. The round table is 16½ in. in diameter and the capacity of the machine is up to 1½-in. holes.

— 10 —

Drilling Machine, "Viktor." *The Henry & Wright Mfg. Co., Hartford, Conn.* [A.M., vol.59,p.530.]

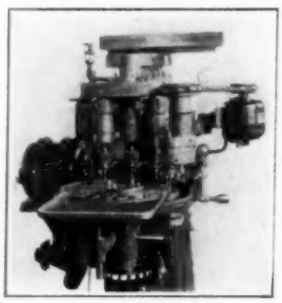
The column of this production milling machine is made in two sections which are attached to the pedestal. The

transverse drive shaft is located in the top of the pedestal and geared to vertical shafts in the columns. The spindles are belted to the vertical shafts, and pulleys of different diameters are provided to change speeds. The maximum distance of the chuck jaw from the table is 27½ in., 6½ in. of this distance being covered by the vertical traverse of the sleeve and the remainder by the vertical adjustment of the table. The table is 16 in. square and the spacing of the spindles on the multiple spindle machines is 9 in. Hand feed and a series of power feeds are available. The machine will drive a ¾-in. drill and is furnished with 1, 2, 3, 4, 6, or 8 spindles.

— 11 —

Drilling and Tapping Machine, Combined. *Anderson Die Machine Co., 544 Iranistan Ave., Bridgeport, Conn.* [A.M.,vol.59,p.678.]

This machine is a development of others which have been described in the *American Machinist* but which were designed for tapping only. A feeding dial for all kinds of work that come within the range of the machine is provided, and there are three reversible spindles for tapping which are adjustable for position and are operated by the oscillating segmental gear common to the Anderson type of machines. In addition this machine has two high-speed



drilling spindles, driven by a belt from a separate motor. The addition of these drilling spindles enables the machine to complete the drilling and tapping of small pieces in one cycle.

— 12 —

Drilling Machines, Sensitive, Semi-Automatic. *Kingsbury Manufacturing Co., Keene, N. H.* [A.M.,vol.59, p.35.]

These machines use an automatic drilling unit which was described on page 666, Vol. 57, of the *American Machinist*. In the multiple-spindle machine illustrated, four units are mounted on a frame and in front of the spindles is placed a table upon which the work fixtures may be clamped. Either No. 8 or 8½ drilling heads may be used. The operator has only to place the work in the fixture and trip the drilling head as the drill feed is automatic, being increased or retarded to suit the resistance of the drill. Special fixtures can be

furnished. The other machine has two heads opposed to each other, one of which can be used for drilling and the other for reaming.

— 13 —

Drilling Machine, Multiple, Horizontal, Duplex. *Fox Machine Co., Jackson, Mich.* [A.M.,vol.59,p.350.]

The machine has two spindle heads which slide upon the horizontal rails, and a revolving work fixture is mounted above the central pedestal. The fixture has four stations, the loading position being at the front of the machine. Each head carries six spindles and has an independent feed and knock-out. The

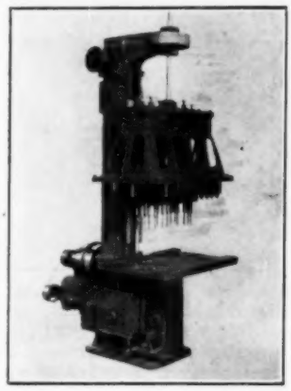
two bottom spindles carry ⅞-in. drills, the two special boring spindles are at the rear, and the two reaming spindles are at the top. The motor is mounted at the rear and drives the machine through a silent chain. The main drive shaft and the spindle drive shaft are also connected by a silent chain. The machine was originally built for machining nickel-steel automobile steering knuckles.

— 14 —

Drilling Machine, Multiple-Spindle. *The Fox Machine Co., Jackson, Mich.* [A.M., vol.59,p.459.]

The feature of this machine is the light weight drill head for which the aluminum casting weighs 174 lb. The head carries 22 drills, 20 of which are ¾ in. and two ⅝ in. in diameter. When the treadle is depressed the head automatically travels up and down, the number of cycles per min. being either 5, 8 or 11. This automatic feed mo-

tion of the head is produced by an adjustable crank in the base which is driven through suitable clutches and a worm. The maximum travel of the

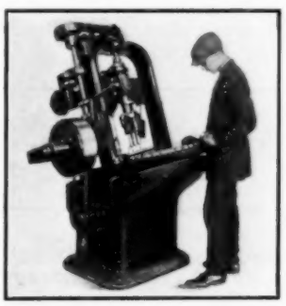


head is 7 in., and the position of the head may be adjusted vertically through a distance of 15½ inches. The drive shaft is arranged to be driven from a countershaft at 400 r.p.m., and drives the feed gear box shaft through a belt. The driving shaft of the head is also belt-driven from the main shaft.

— 15 —

Drilling Machine, Production, Tilted. *Edlund Machinery Co., Inc., Cortland, N. Y.* [A.M.,vol.59,p.783.]

The machine illustrated is equipped for drilling ⅝-in. holes in rim nuts of two lengths, $\frac{5}{16}$ and $\frac{11}{16}$ in. It is stated that one operator can easily run two machines and generally three, the production per machine being 775

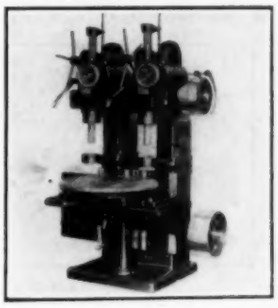


of the former and 700 of the latter size per hour. The nuts are carried in bushings in the table which is indexed at each cycle of the feed cam. A three-spindle drilling head drills three nuts at once. The drive pulley is connected to a vertical shaft through bevel gears, the latter being equipped with a clutch which controls both spindle and feed. The drive for the feed cam is taken off above the clutch, and the spindle is driven by a Morse silent chain. The camshaft is driven through worm gearing. The speed of the cam can be changed by change gears.

— 16 —

Drilling Machine, Two-Spindle, No. 2. *Colburn Works of the Consolidated Machine Tool Corp. of America, Rochester, N. Y.* [A.M.,vol.59, p.929.]

This machine differs from the regular No. 2 two-spindle machine manufactured by this company only in the addition of steady supports and a special three-station rotating table. The rotating table is clamped to the machine table and has positions for loading, drilling and reaming. Levers are provided for releasing the index-

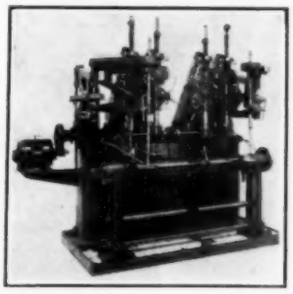


ing latch and clamping the table in position. The steady supports are fastened to the frame above the table. A four-station table can be furnished for work on which two drilling operations are required, and the table is then indexed through 180 deg. to bring the work under the drills.

— 17 —

Drilling and Reaming Machine, Front Axle. *Barnes Drill Co., 814 Chestnut St., Rockford, Ill.* [A.M.,vol.59, p.968.]

This special-purpose machine consists of a Barnes 24-in. gang drilling machine to which has been added a turnover jig and auxiliary reaming apparatus. The spring pad holes at either end of the axle are drilled simulta-

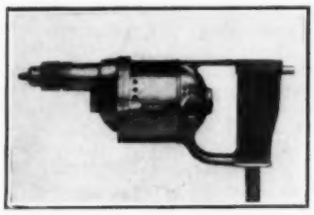


neously by multiple drill heads attached to the center pair of drill spindles, and the two outer heads drill the king pin holes at the same time. The king pin holes are reamed in the axle held in the other side of the jig while the drilling operations are being done, and the finished axle is replaced by another. The reaming spindles are carried in two radial heads. The trunnions of the jig are mounted at the top ends of two heavy links, the lower ends of the links being pivoted on the base. These links allow the jig to be swung out to clear the table of the machine as it is turned over, an air cylinder being provided to swing the jig in and out. It is stated that this machine effects a doubling of production over the former methods.

— 18 —

Drill, Electric, ¼ In. *United States Electrical Tool Co., Cincinnati, Ohio.* [A.M.,vol. 59,p.194.]

This tool will handle drills up to ¼ in. in diameter. The handle and body are integral and of cast aluminum. The switch is placed at the upper end of the handle. A 3-jaw chuck is fitted to the spindle which is geared to a motor

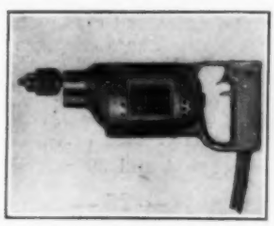


that will operate on d.c. or a.c. circuits. S.K.F. ball bearings and hardened chrome nickel steel gears are used. By the use of other attachments the tool may be made to serve as a grinder, a bench drill or a bracket drill.

— 19 —

Drill, Electric, Portable, $\frac{5}{16}$-In. *Black & Decker Mfg. Co., Baltimore, Md.* [A.M., vol.59,p.672.]

This tool is similar to the ¼-in. size made by this company and previously described on p. 742, Vol. 55, of the *American Machinist*. The motor is more powerful and the weight is greater. It is equipped with the pistol grip and trigger switch which characterize the tools of this



line. The 3-jaw chuck is adapted for straight shank drills. The tool weighs 7 lb., and the no-load speed of the motor is 1,400 revolutions per minute.

— 20 —

Drill, Side-Handle, 5-16-in. *Hisey-Wolf Machine Co., Cincinnati, Ohio.* [A.M.,vol.59, p.967.]

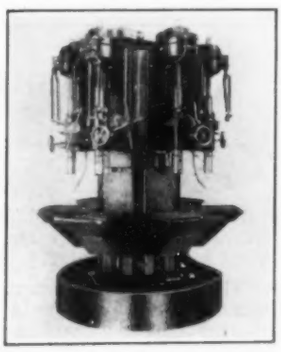
This electric drill is equipped with a universal motor which will operate on 60-cycle alternating current or direct current. High grade ball bearings are provided

throughout and the gears are of steel, accurately machined and heat treated. The gear end is supplied with lubricant from the gear transmission case, and the ball bearing at the top is packed with grease. The usual cable and attachment plug are provided, and a grinding wheel attachment with a 4½-in. wheel can be furnished. The Jacobs chuck will hold straight shank drills up to 5/16 in. in diameter.

— 21 —

Drilling and Boring Machine, Rotary, No. 123. *Baker Bros., Toledo, Ohio.* [A.M., vol.59,p.858.]

This machine is essentially a combination of six Baker single-spindle machines ro-



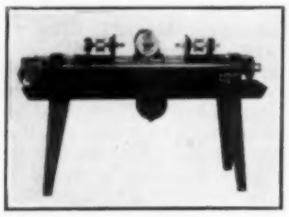
tating continuously about a center column, and is adapted for high-production work where the occupation of a minimum amount of floor space is desirable. The continuous rotation of the units is obtained through change gears and worm gearing, the cycle being timed to suit the requirements of the work. Each spindle has four speeds, obtained through sliding gears, and will handle drills up to 1¾ in. in steel. The machine is driven by a horizontal shaft in the base which may be fitted with tight and

loose pulleys for belt driving, or geared to a motor. All gears are made of hardened alloy steel and are arranged to run in oil. The shafts are mounted in ball bearings. The distance from the spindle centers to the face of the column is 11 in. and the length of feed is 15½ in. The diameter of the spindles is 1⅞ in. and they have a No. 4 Morse taper.

— 22 —

Drilling Machine, Horizontal, Duplex, No. 0. *Garvin Machine Co., Spring and Varick Sts., New York, N. Y.* [A.M.,vol.59,p.859.]

The heads of this machine slide longitudinally on the bed, the motion being derived from cams at either end of the machine. A spring which

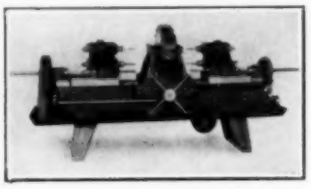


keeps the cam roller against the cam is enclosed in each head. Two sets of cams and change gears are furnished, giving a production of 11 and 16 pieces per min., respectively. An air-operated automatic chuck is mounted on the bed between the heads, the air valve being operated by a cam at the left-hand end of the bed. The machine will handle drills up to ½ in. in diameter in cast iron. The spindles are mounted in ball bearings and the maximum speed is 3,000 rev. per minute.

— 23 —

Drilling Machine, Horizontal, Duplex, 3-spindle. *Garvin Machine Co., Spring and Varick Sts., New York, N. Y.* [A.M.,vol.59,p.969.]

This drilling machine is designed for drilling, boring and reaming automobile steering knuckles. Two heads



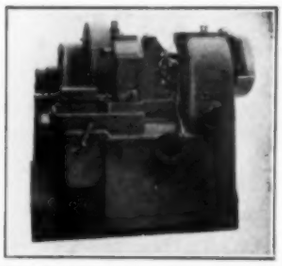
are arranged to slide longitudinally on the bed and each head carries three spindles. The work is held in a squirrel-cage fixture at the center and is indexed after each operation. Operations on three pieces are accomplished simultaneously; a ¾-in. hole is drilled in one, this hole is bored to 27/32 in. in diameter on the next, and finish reaming to ¾ in. in diameter is done on the third. The heads feed toward the work automatically and are returned by hand. The feed is thrown in as soon as the fixture is indexed and the machine is said to finish one knuckle every 40 sec. A 7½-hp. motor drives each head, the power being transmitted through spur gears.

Gear-Cutting Machines

— 24 —

Gear Generator, Bevel, 8-In. *Gleason Works, Rochester, N. Y.* [A.M.,vol.59,p.490.]

This is a single-purpose machine for producing straight bevel gears on a mass production basis. The

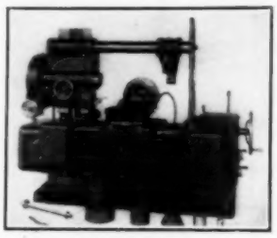


machines can be set up separately or bolted together in a battery. The same basic principle of generating the tooth is used as on the universal machine manufactured by this company, in which the tooth contour is developed by rolling the work and the tools relative to each other at a uniform pitch line velocity. The amount of movement necessary for the relief of the tools is small, and this fact tends to make the machine quiet and steady in operation. The tools are the same as those used on the 11- and 18-in. machines. A lubricating pump oils all points of the machine. The time for generating one tooth varies between 4 and 30 seconds.

— 25 —

Hobbing Machine, Gear, Spur and Spiral. *Brown & Sharpe Mfg. Co., Providence, R. I.* [A.M.,vol.59,p.635.]

This machine is designated as No. 44 and will hob spur and spiral or helical gears up to 18 in. in diam. and 3 diametral pitch in cast iron, or 4 diametral pitch in steel. The work spindle is located in the housing at the left and the hob is mounted on the carrier which slides longitudinally on the bed. Change gears provide 10 speeds for the hob spindle, ranging in geometrical progression from 45 to 166 r.p.m. The swivel on the hob slide may be swung 90 deg. either way from zero, so that the full range of the machine may be used for cutting right- or left-hand helical teeth. A feature of the mechanism is the differential gear, by means of which the change of relative speed between the

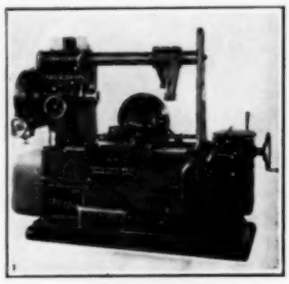


hob slide and the work spindle to produce helical teeth is obtained. The machine will cut all numbers of teeth from 6 to 50, and from 50 to 180 with the exception of the prime numbers. Twelve changes of feed from 0.010 to 0.153 in. per revolution of work are provided by means of change gears.

— 26 —

Hobbing Machine, Gear, No. 34. *Brown & Sharpe Mfg. Co., Providence, R. I.* [A.M.,vol.59,p.965.]

In its general features this machine follows the No. 44 machine noted above, but is adapted to the hobbing of straight spur gears only. On account of its limitations, it has been possible to make



the machine more simple and to improve the strength and simplicity of the drive. The parts of the machine are disposed in the same manner as in the earlier machine, the main difference being the driving gearing for the hob. The power for the hob is taken from a splined shaft at the rear of the machine and transmitted to the hob spindle through bevel gearing. The upper part of the carriage upon which the hob is mounted is arranged to swivel to any angle up to 10 deg., in one direction only, so that only right-hand hobs can be used. The bevel gearing is covered by a casing attached to the carriage. The splined shaft which drives the hob passes along the back of the machine to the feed box and operates the feed gearing through change gears. Ten hob speeds are available and 12 rates of feed. The machine will cut plain spur gears up to 4 diametral pitch in steel, and 3 diametral pitch in cast iron. Hobs up to 5 in. in diameter can be used.

Grinding Machines

— 27 —

Grinder, Centerless. *Cincinnati Milling Machine Co., Cincinnati, Ohio.* [A.M.,vol. 59,p.339.]

This machine may be used for grinding shoulder work as well as straight cylindrical parts. The main grinding wheel is 20 in. in diameter and the work is fed between this wheel and a 12-in. abrasive wheel known as the control wheel. The speed of the control wheel controls the rotative speed of the work and 16 speeds are provided. The control wheel is carried in a tilting housing by which the wheel can be placed at an angle to give the proper feed to the work. The work rest is mounted on the tilting housing slide and is adjustable for various diameters of work. The machine may be either belt- or motor-driven and a 10- to 15-hp. motor is required. The main grinding

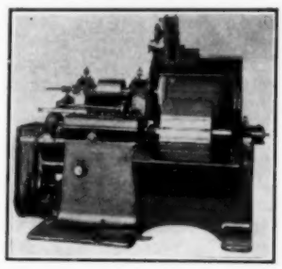
spindle is mounted in special bearings in the base to reduce vibration. The wheel-truing devices are conveniently mounted on the wheel

covers. The capacity of the machine is from ⅜ to 1½ in. on the standard rest and up to 10 in. long. Special equipment allows the grinding of work up to 3 in. in diameter, and up to 8 ft. long. The net weight is 5,000 pounds.

— 28 —

Grinder, Disk, Semi-Automatic. *Gardner Machine Co., Beloit, Wis.* [A.M.,vol. 59,p.346.]

The main feature of this machine is an octagonal drum on which the work is mounted in fixtures and carried to the grinding position. The motion of the drum is controlled by a pedal which op-

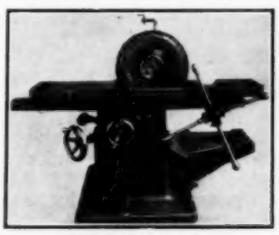


erates a disk clutch at the left-hand end of the machine, and its speed is varied, depending upon the amount of stock to be removed and the speed of the operator in loading and unloading the fixtures. The spindle is carried in a slide which is arranged so that the grinding member is advanced against the work by a spring whose action is controlled by a cam. For dry grinding the Gardner improved abrasive disk is used, and for wet grinding an 18-in. abrasive ring, carried in a special chuck.

— 29 —

Grinding Machine, Face, 18-In. *Graham Mfg. Co., 71 Willard Ave., Providence, R. I.* [A.M.,vol.59,p.818.]

The 18-in. ring wheel used with this machine is held in a pressed steel collar attached to the spindle which is mounted in Timken roller bearings. A bracket for the

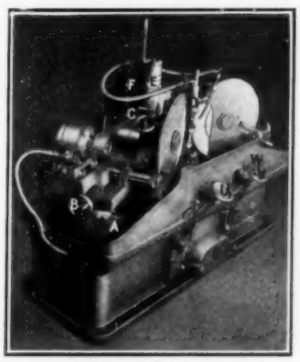


driving motor is provided at the side of the column, the motor driving the spindle through a belt at about 1,200 r.p.m. The knee is gibbed to the column and has a vertical movement of 8½ in. The saddle has a cross movement of 3½ in. The working surface of the table is 13x44 in., and the table has a hand-operated traverse of 24 in. It is provided with large channels for the cooling liquid, and a No. 2 Brown & Sharpe geared pump supplies the liquid from a settling tank located in the base of the machine. The machine may also be driven from an overhead countershaft, if desired. The floor space required is approximately 3x4 ft. From 15 to 20 hp. is necessary to drive the machine.

— 30 —

Grinding Machine, Gear Tooth. *Pratt & Whitney Co., New York, N. Y.* [A.M.,vol. 59,p.535.]

This machine employs two grinding wheels, and the gear is moved in relation to them by means of a novel mechanism. Each wheel is rotated by an independent motor mounted upon its slide and can be adjusted to the proper angle with the gear. The flat face of the grinding wheel is used for grinding and the relative motion of the gear in relation to the wheels is that of a gear rolling along a rack. The gear is mounted upon an arbor carried in a swiveling mechanism and is moved from one wheel to the other by a driving mechanism attached to the lower end of the arbor. This mechanism causes the gear to roll past

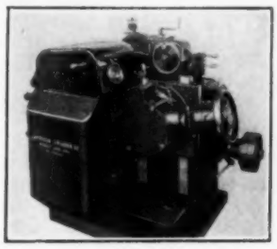


the grinding face of one wheel in the proper manner, during which action the wheel takes a cut on one side of a tooth. The motion of the arbor then takes the gear to the other wheel where the same operation is repeated on the reverse side of a tooth. The planetary action of the arbor driving mechanism causes the gear to be indexed continually in relation to the wheels so that successive teeth are ground. The action takes place very rapidly. Suitable devices for locating the gear on the arbor, truing the wheel faces, and testing the ground faces of the gear teeth are provided.

— 31 —

Grinding Machine, Gear, Spur. *American Grinder Co., 6543 Benson St., Detroit, Mich.* [A.M.,vol.59,p.659.]

This machine is of the pure generating type, the action being that of rolling the gear along an imaginary rack with the grinding wheel as one

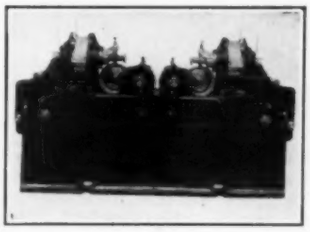


tooth of the rack. The flat surface of the wheel does the grinding and a truing device is provided. The wheel head is arranged to swivel to right or left of the center up to 23 deg. An automatic mechanism stops the work carriage when the last tooth of the gear is ground, and also the wheel if desired. The work carriage is driven by a cam in the bed of the machine, and the motion of the work spindle is obtained by means of thin steel tapes winding and unwinding on a pitch diameter segment or circle as the carriage is driven back and forth. Hardened and ground notched plates are used in the index mechanism. A slotted locating ring is furnished for locating the gear on the spindle, so that it will mesh properly with the grinding wheel. The capacity of the machine ranges from 2- to 8-in. pitch diameters, and any pressure angle up to 25 deg.

— 32 —

Grinder, Gear. *Fellows Gear Shaper Co., Springfield, Vt.* [A.M.,vol.59,p.963.]

This machine consists of two sections, one right-hand and one left-hand, for grinding the opposite faces of the teeth. After the gear is located on the spindle, the machine automatically takes

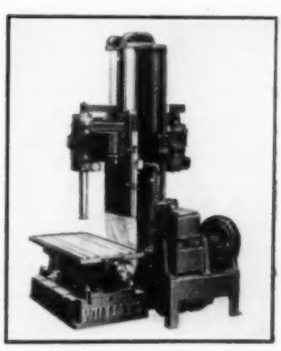


care of the rolling action of the gear against the flat surface of the wheel, indexes for each tooth, trues the flat face of the wheel, and stops when the gear is completed. The main elements of the grinder are a base, carrying a grinding wheel head which is adjustable for different gear diameters, and a slide upon which is mounted a "rolling head" which carries the gear on an arbor and is controlled by a master involute tooth. This master tooth contacts with an abutment made in the form of a long, straight-sided rack tooth, and is adjustable for controlling the pressure angle of the teeth being ground. Uniform pressure of the gear against the grinding wheel is provided by means of a suitable counterweight attached to the rolling head. The grinding wheel is unusually small, the small wheel having advantages in operation. An involute measuring instrument is furnished for checking the accuracy of the work done.

— 33 —

Grinder, Cylinder, Vertical, Williams. *Hy-Way Service Co., Elkhart, Ind.* [A.M.,vol. 59,p.714.]

The grinding head of this machine slides on the double column, and an arm projects to the rear, on which the 2-hp. motor for driving the spindle is mounted. The spindle is mounted in ball bearings and runs at 7,000 r.p.m. The planetary action of the spindle is obtained through a double-eccentric arbor in which the spindle is mounted. The eccentrics are adjustable and the arbor is driven by an

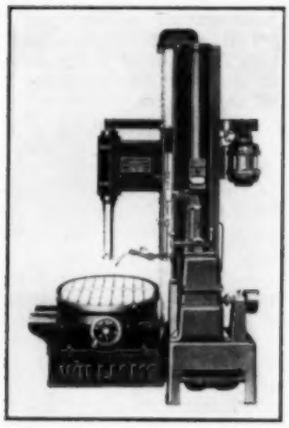


independent motor through a worm gear. The feed of the grinding head is accomplished by an Oilgear pump which furnishes oil to a ram placed below the center of the head. The pump is driven by a separate motor and is mounted on a stand at the side of the machine. A universal table is provided to hold the work and has a 36x18-in. surface. The vertical travel of the head is 28 in. and the distance from the center of the arbor to the apron is 11 in. For large work the table may be removed and the part to be ground may be attached to the bed.

— 34 —

Grinder, Internal, Vertical, Williams. *Hy-Way Service Co., Elkhart, Ind.* [A.M.,vol. 59,p.747.]

This machine is similar to the cylinder grinder manufactured by this company, with the exception of the grinding head and the work table. The grinding spindle and its motor are mounted on the head and the spindle runs at 7,000 r.p.m. The regular spindle is adapted for grinding holes from 3½ to 20 in. in diameter. The work is mounted upon a revolving table 24 in. in diameter. The table has an in-and-out travel of

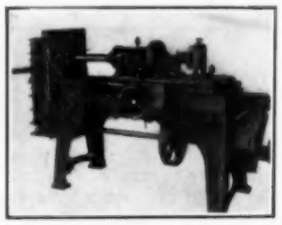


12 in. and is driven by a separate ¾-hp. motor. The feed is controlled by an Oilgear pump which operates a hydraulic ram under the head. A water pump for cooling is mounted on the stand with the oil pump and is driven by the same motor.

— 35 —

Grinding and Reboring Machine, W & B. *Automotive Service Works, 1111 W. Main St., Oklahoma City, Okla.* [A.M.,vol.59,p.894.]

The faceplate of this machine, which holds the work in position, is mounted at the left-hand end of the bed and



can be adjusted to bring the work into proper relation to the spindle center. The tool head or carriage slides on the ways and is fed automatically by a screw. It may also be traversed by a hand-operated rack and pinion when the feed is disengaged. The feed gearing is operated through jaw clutches automatically actuated by the carriage. The maximum travel of the carriage is 22 in. The grinding spindle is mounted in bronze and ball bearings and runs at from 4,500 to 5,700 r.p.m. The planetary action of the spindle is obtained by means of two eccentric sleeves. The boring head is screwed on the end of the spindle mandrel for reboring operations. The machine may be driven by a motor or tight and loose pulleys.

— 36 —

Grinding Machine, Frog and Switch. *The Automatic Machine Co, 113 E. Washington Ave., Bridgeport, Conn.* [A.M.,vol.59,p.33.]

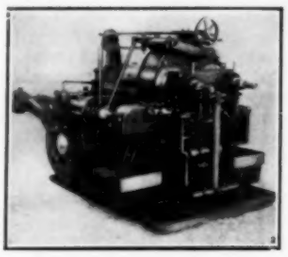
This machine was built for grinding railroad track elements that are made up of manganese steel and cannot be machined in any other way. It is a manufacturing machine and is mounted upon a permanent narrow-gage track at a height to allow necessary clearance under the grinding wheels. A bed for supporting the work is placed adjacent to the track and under the grinding wheels. A 15-hp. motor traverses the machine along the track. The two grinding heads have a transverse movement along a beam which serves the same purpose as the cross-rail of a planer. Independent vertical and transverse movement of the heads is provided. The

grinding wheels are 14 in. in diameter and driven through belts by independent 10-hp. motors. All rotating parts are mounted in ball bearings and counterweights are provided for the overhanging parts.

— 37 —

Grinder, Surface, Rotary, Duplex, Osterholm. *Williams, White & Co., Moline, Ill.* [A.M.,vol.59,p.36.]

This machine was designed for the automatic surface grinding of such parts as thrust washers, clutch disks, bearing races, etc. The work to be ground is carried in two chucks at the front of the machine, the chuck bearing head being hinged so that it will swing back from the wheel for loading. The large cam at the rear raises the chucks to the loading position and advances the wheel to the work, the rate of advance being governed by the shape of the cam. At the completion of grinding the chucks automatically drop to the loading position and the machine stops. Mechanically or magnetically operated chucks



may be used. Cylinder grinding wheels 20 in. in diameter are used and the cycle of the machine may be varied from 20 sec. to 2 min. by means of change gears. The work spindle speeds are from 8 to 12 r.p.m. and the wheel revolves at from 900 to 1,000 r.p.m.

— 38 —

Grinder, Surface and Internal, Radius, Sundstrand. *Rockford Milling Machine Co., Rockford, Ill.* [A.M.,vol.59, p.155.]

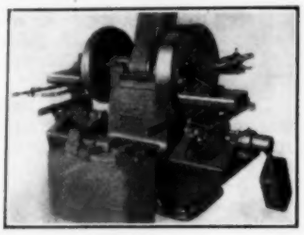
The principal feature of this machine is the pendulum motion for radius grinding which is easily swung out of the way for internal and surface grinding. A planetary mechanism gives the proper spindle motion for internal grinding. The base has guides for the work table and spindle column, and carries the column for the radius bar at the back. The length of the radius link may be adjusted from 18 in. to 100 in. and for radius grinding the work is held on the 12x36-in. vertical table which is secured to the link. The 50-in. oscillating motion of the horizontal table is automatically controlled.

The spindle head has a vertical adjustment of 20 in., and the planetary adjustment allows grinding holes 1¾ in. larger than the wheel.

— 39 —

Grinder, Surface. *Badger Tool Co., Beloit, Wis.* [A.M., vol.59,p.344.]

The spindle of this grinder carries two ring-type wheels 24 in. in diameter. The work is mounted in fixtures on rocking tables which are mechanically oscillated to move the work back and forth across the face of the wheels. The grinding is done under spring pressure which acts through the table hand lever.

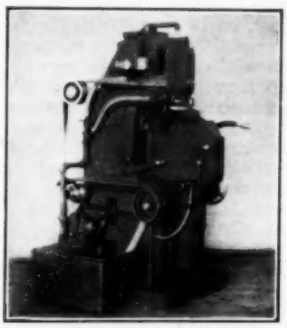


The table rocking mechanism is disconnected for loading and unloading the fixtures. It is said that one operator can keep both ends of the machine busy.

— 40 —

Grinding Machine Surface, Rotary, Vertical, Single-Stroke. *O. S. Walker Co., Inc., Worcester, Mass.* [A. M.,vol.59,p.815.]

This machine is intended for surface grinding operations on flat disks and on other small parts, which can be held on a magnetic chuck.

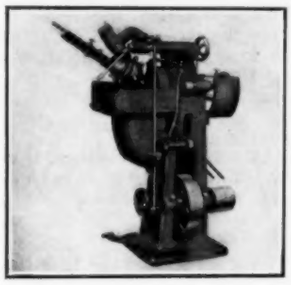


The cup-shaped wheel is held in a suitable holder at the lower end of a vertical spindle. The spindle is mounted on ball bearings in a head which is arranged to be moved vertically on the column by hand through a distance of 5 in. The spindle is driven by a 3-in. belt running over idlers from the drive shaft in the base of the machine. The work spindle carries a standard Walker 12-in. magnetic chuck and is mounted in a sleeve in a head which can be adjusted on the column. The sleeve with the spindle can be moved through a distance of 4 in. by means of a geared handwheel mechanism. A pair of 3-step cones in the chuck drive provide the speed changes. The movement of the grinding wheel to the work is made through a single movement of the lever, bringing the upper head against the adjustable stop.

— 41 —

Grinding Machines, Twist Drill, Blau. *Friedrich Neumann's Successors, Inc., 42 E. 20th St., New York, N. Y.* [A.M.,vol.59,p.70.]

A small machine for use on drills from No. 38 to ⅝ in. in diameter, and a larger one for drills from ⅝ to 2 in. in diameter are made. The larger machine is shown in

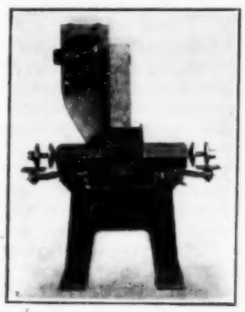


the illustration. The grinding spindle carries an annular wheel for grinding the drill and at the other end a small grinding wheel for thinning the point of the drill. A pump and water circulating system are provided. The drill is held in a chuck or gripping-head, the front end of the drill being held in jaws which fit each land near the cutting edge. The shank is held in a reversible cup-shaped retainer and the whole head swings about the horizontal shaft at the top of the column. A pedal mechanism, when depressed, causes the head to oscillate automatically. After one lip is ground the head is indexed 180 deg., so that the second lip is a duplicate of the first. The smaller machine operates by means of a similar mechanism except that the automatic oscillating device is not used.

— 42 —

Grinders, Motor-Driven, Belted, Roller-Bearing. *St. Louis Machine Tool Co., 932 Loughborough Ave., St. Louis, Mo.* [A.M.,vol.59,p.158.]

The line of grinders manufactured by this company has been improved through the addition of individual motor drives and roller bearings for the spindles. Four roller



bearings are provided on the spindle, two close to the grinding wheels, and two close to the driving pulley. The motor is mounted on a bracket above the spindle, which it drives by a belt, as shown in the illustration. Means are provided for keeping the belt tight.

— 43 —

Grinder and Buffer, Combination, Motor-Driven. *Hisey-Wolf Machine Co., Cincinnati, Ohio.* [A.M.,vol.59,p.196.]

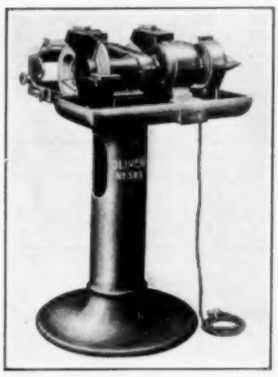
The motor of this machine is direct-connected and bolted to the top of the floor stand. The spindle extension is a separate unit and is connected

to the motor armature by a suitable clutch. Each shaft unit is supported on ball bearings. The no-load motor speed is 3,500 r.p.m. and a 1-hp. motor, to suit conditions of voltage and current, will be furnished. The machine is adapted for work requiring the use of a grinding wheel, buffing wheel, wire brush wheel or rotary wire rasp wheel.

— 44 —

Grinder, Oilstone. *Oliver Machinery Co., Grand Rapids, Mich.* [A.M.,vol.59,p.531.]

This grinding machine is designed for sharpening

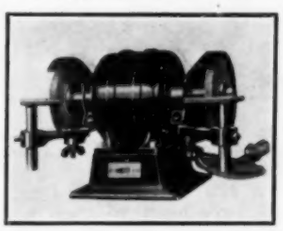


woodworking tools and carries a total of four grinding wheels. Two of these are oilstone wheels mounted on a shaft which is geared to the motor shaft and runs at 300 r.p.m. An emery cone, a leather stropping wheel, and a general purpose grinding wheel are direct-connected to the motor, and all run at 1,800 r.p.m. All wheels have suitable guards and the shafts are mounted in ball bearings. Motors for direct or alternating current can be furnished and may be connected to any convenient lamp socket.

— 45 —

Grinder, Portable. *Bodine Electric Co., Ohio St. and Oakley Blvd., Chicago, Ill.* [A.M.,vol.59,p.782.]

This machine has ball bearings and is motor driven. It is especially intended for use in the various departments of a shop, giving the advantage of greater convenience. A screw adjustment is provided to take up wear in the spindle bearings. The tool rest is adjustable and is clamped in position by a thumbscrew. The motor is

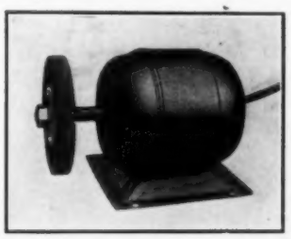


protected by a dustproof casing and a switch is mounted on the front of the base. A suitable attachment cord and plug is furnished.

— 46 —

Grinder, Tool, Bench. *Atta Tool Co, 172 Union St., Worcester, Mass.* [A.M.,vol. 59, p.821.]

The feature of this small grinder is the fact that it is made almost entirely of sheet metal stampings. The rotor shaft is the only machined part. The base is a single stamping and the body is composed of two cups, held



together and to the base by the central band. One machine screw is used in the construction. The motor is designed for 110-volt alternating current only and may be attached to any convenient lighting socket.

The machine will carry a 4 x ½-in. grinding wheel and is exceptionally light in weight and compact in design.

— 47 —

Drill Pointer, Automatic, No. 2. *Oliver Instrument Co., Adrian, Mich.* [A.M., vol.59,p.895.]

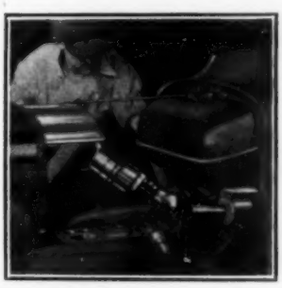
The motions of this machine for producing a point on a drill are entirely auto-

matic. The grinding wheel is of the cup type and runs at 3,950 r.p.m., a ¼-hp. motor being mounted in the base of the machine. The drill holder is made to take a No. 2 taper shank, and a No. 1 Morse taper sleeve is furnished for small drills. By means of a cam action the drill holder rotates the drill and advances it in timed relation to a forward and backward motion of the grinding wheel. This action produces, it is claimed, a theoretically correct drill point. The machine is built to handle two-lipped drills only, and each size and type of drill is ground in the same manner.

— 48 —

Grinder, Valve, "Double-Action." *A. H. Petersen Mfg. Co., Milwaukee, Wis.* [A.M., vol.59,p.233.]

This valve grinder imparts, through a gear arrangement, a combined rotary and oscillating motion to the valve, which duplicates the motion



obtained by experts using hand-operated tools. An offset attachment which permits access to all valves is furnished. All types of valves

can be handled by means of attachments furnished with the tool. The motor operates on d.c. or a.c. circuits and the chuck revolves at 15 r.p.m., making 275 oscillations in the same time.

— 49 —

Grinder, Bench, Flexible Shaft. *Keller Mechanical Engineering Corp., 70 Washington St., Brooklyn, N. Y.* [A. M.,vol.59,p.636.]

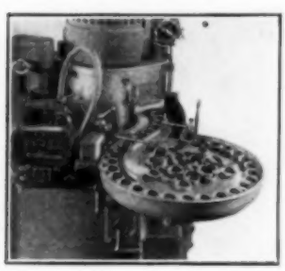
The motor of this machine is mounted in a swivel on a cast-iron pedestal, and drives a jackshaft through a 3-step

cone pulley. The jackshaft has an eccentric mounting so that shifting the belt is convenient and easy, the available speeds being 875, 1,750 and 3,200 r.p.m. The handpiece is provided with ball bearings and the flexible shaft runs in a strong metal sheath. A variety of tools for use with the apparatus are furnished, including burrs, grinding wheels and polishers. A ¼-hp. Ohio motor is furnished. The apparatus in working order weighs about 77 pounds.

— 50 —

Loading Device, Dial, for Surface Grinder. *Blanchard Machine Co., 64 State St., Cambridge,* Mass. [A.M.,vol. 59,p.309.]

This device was developed for use with the Blanchard No. 16-A grinder and consists

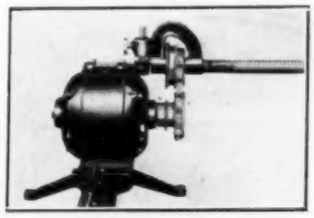


of a rotating table upon which the work is placed. A large number of pieces may be placed on the table and are then fed continuously and automatically to the magnetic chuck. The chuck is non-magnetic at the loading position and is automatically magnetized at the position where the work passes under the grinding wheel. The device is adapted for use upon such work as rings, washers and similar articles which will lie flat on the table.

— 51 —

Countershaft, Multiple-Speed, for Flexible Shaft Grinders. *R. G. Haskins Co., 516 W. Monroe St., Chicago, Ill.* [A.M.,vol.59,p.350.]

The main feature of this mechanism is the link type belt, made of leather and fiber links with steel connectors. This style of belt is

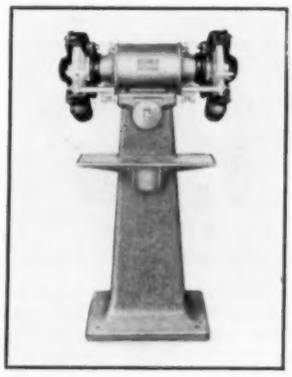


used to eliminate slippage and secure positive action when running at high speed on a short drive. The pulleys have been widened and shaped to fit the links. The countershaft provides a convenient method of attaching the motor to the shaft and gives the operator a selection of speeds to fit the work. It is now furnished with all Haskins equipments.

— 52 —

Grinder Improvements. *Hisey-Wolf Machine Co., Cincinnati, Ohio.* [A.M.,vol.59, p.675.]

The line of grinders manufactured by this company has been improved by the addition of adjustable wheel

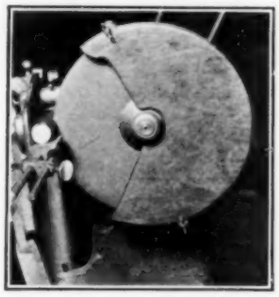


guards and a superior design of motor starter switch. The guards are interchangeable with the standard open type guards, are fitted with removable end covers and exhaust pipe connections, and are adjustable to any angle. As the wheel wears the guards may be moved back on their brackets to give full access to the wheel. The motor starter consists of a conveniently located switch button, and the switch proper is enclosed in the base.

— 53 —

Cut-off Wheels, Redmanol Aloxite. *Carborundum Co., Niagara Falls, N. Y.* [A.M., vol.59,p.782.]

These Aloxite cut-off wheels are made with Redmanol as the bonding agent. This phenol resin provides a bond that will not soften or melt, thereby giving an open, porous wheel structure which tends to produce a free, clean-cutting wheel that will cut without binding. Prac-

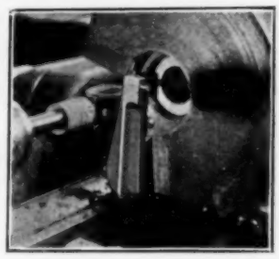


tice has shown that wheels 12 in. in diameter are most suitable for general work and they can be made as thin as $\frac{1}{16}$ in. Various grades of wheels are made for different materials.

— 54 —

Wheel Dresser, Improved, Teromatic. *Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.* [A.M.,vol.59,p. 895.]

The wheel dresser on the line of machines made by this company was formerly located on the carriage of the machine, where it required hand adjustment. It is now located on the headstock and each time the wheel is brought clear of the work and returned to the grinding position, it passes the dia-

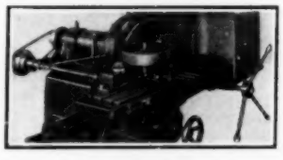


mond and is dressed. The cut taken across the wheel is very slight but it eliminates the loss of time while dressing the wheel.

— 55 —

Attachment, Grinding, Pulley. *The Graham Manufacturing Co., 71 Willard Ave., Providence, R. I.* [A.M., vol. 59,p.932.]

This attachment is fitted to the table of a standard Graham face grinding machine and is driven through a universal shaft from a three-step cone pulley attached to the rear end of the grinding wheel spindle. An adjustable base attached to the table of the machine holds a straight arbor over which the pulley to be ground is slipped. The pulley is driven by a conical burr of hardened steel, having a serrated surface upon which the rim of the pulley rests. Three work speeds are available, and the burr may be started and stopped at will by means



of a clutch. Pulleys may be ground flat, concave, or with a crown, the surface contour depending on the position of the pulley in relation to the grinding wheel. Pulleys up to 24 in. in diameter are regularly ground and 30-in. pulleys can be handled by removing some of the water guards.

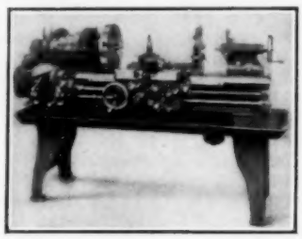
Lathes

— 56 —

Lathes, Toolroom. *American Tool Works Co., Cincinnati, Ohio.* [A.M.,vol.59,p. 160.]

These lathes are furnished with single back-geared head, double back-geared head or all-geared head. The 4-step cone head illustrated is used on all lathes up to 20 in. in size, and a 3-step cone, double back-geared head of the quick change, friction type is used on the larger sizes. The all-geared head provides 12 spindle speeds in geometric progression. This head is automatically oiled. An a.c. or d.c. motor may be mounted on a planed pad on top of the head for individual motor drive, other types of mountings may also be used and apron control is provided. The

apron is of double-plate, box construction with steel gears and a removable rack pinion. The lead screw and feed rod are independent and no speed-

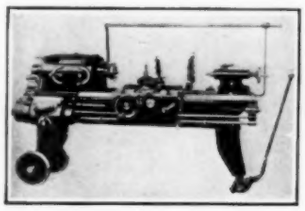


ing up is required for coarse leads and feeds. The machines are built in eight sizes, ranging from 12 to 27 in.

— 57 —

Lathe, Geared Head, Portable, 15-In, Sundstrand. *The Rockford Tool Co.*, 2402 11*th St., Rockford, Ill.* [A.M.,vol. 59,p.195.]

This lathe is patterned after the 14-in. size, a description of which was given on page 315, Vol. 56. The wheels which provide the

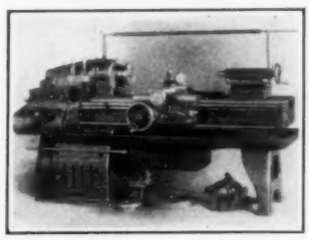


portable feature are attached to heavy box-section legs at either end of the bed. The headstock end is supported on two wheels, and at the other end a single wheel with a suitable fork and steering handle is provided. For motor drive the motor is mounted on the headstock. The lathe will swing 15 in. over the bed and 8¾ in. over the carriage. A 2-hp. motor is required and the approximate net weight is 2,250 pounds.

— 58 —

Lathe, 16-In., Model B. *Pratt & Whitney Co., Hartford, Conn.* [A.M.,vol.59,p. 342.]

The standard design of this lathe has a geared-head with a self-contained motor drive, but a geared-head single-pulley drive, or a cone head with counter-shaft drive are available In the geared head design the back gears have been placed beneath the spindle. Eight spindle speeds from 13 to 525 r.p.m. are possible. The spindle is hardened and ground and bored for a No. 16 Jarno taper. All gears are of the Maag form. The cone head has a four-step cone and gives 16 spindle speeds. The motor is located in the base. The gear box is fitted with a "direct-reading" index plate and provides 36 changes of thread and feed, ranging from 1½ to 80 pitch and from 0.0012 to 0.0665 in. per revolution of spindle, respectively. The leadscrew is 1⅞ in. in diameter and has a 4-pitch, right-hand, single Acme thread. The tool cross-slide has a mechanism for withdrawing the tool quickly when threading. The usual attachments

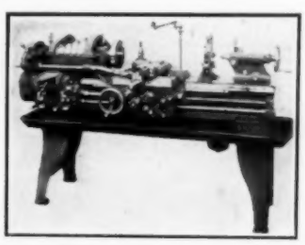


are furnished and the lathe is manufactured in three lengths of bed, 7, 9 and 11 ft. The 7-ft. bed lathe weighs approximately 4,000 lb. without the motor.

— 59 —

Lathe, Engine, High-Duty, 12-In. *American Tool Works Co., Cincinnati, Ohio.* [A.M., vol.59,p.493.]

This lathe is an addition to the line of similar equipment and is built in four bed lengths ranging from 5 to 10 ft. A single back geared head, a quick change double back geared head, or an automatically oiled geared head can be furnished. The geared head furnishes 12 spindle speeds, the single back geared head 8 speeds, and the double back geared head 9 speeds, both forward and reverse. A range of 48

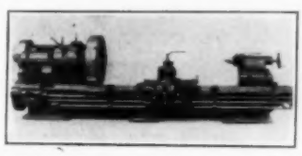


threads and feeds is provided. The lead screw is 1½ in. in diameter with a ⅛-in. pitch of thread. The apron is of the double wall construction and a thread dial is regularly furnished. The lathe swings 14½ in. over the bed and 8½ in. over the compound rest slide. The distance between centers with the 5-ft. bed is 28 in. and the hole through the spindle clears a 1½-in. bar. A motor drive can be furnished for the geared head lathe.

— 60 —

Lathes, Geared Head, Heavy Duty, 30- and 36-In. *R. K. LeBlond Machine Tool Co., Cincinnati, Ohio.* [A.M.,vol. 59,p.532.]

The headstock of these added sizes is of the selective speed type, and 16 speeds, ranging from 4 to 200 r.p.m., are available. A single drive pulley 24 in. in diameter runs at 500 r.p.m., and is driven by a 6-in. belt. The spindle has a 2¼-in. hole and No. 6 Morse taper centers are used. All gears and bearings in the headstock are automaticaally oiled, and the gears are forged and heat-treated, the sliding gears being made from chrome nickel steel. The front shear is V-shaped to resist the thrust of the tool in all directions. The tailstock is equipped with a rack and pinion device to facilitate movement on the bed. The carriage apron is cast in one piece with a double wall which gives all studs and

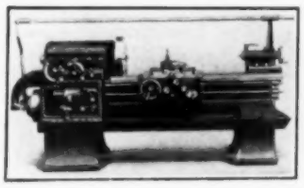


shafts a bearing at each end. The quick change gear mechanism gives a range of 48 speeds and feeds. The machine can be adapted for motor drive, the motor being mounted on a bracket to drive through a belt, or mounted on the head and geared to the first shaft.

— 61 —

Lathe, Low-Drive. *Walcott Lathe Co., Jackson, Mich.* [A.M.,vol.59,p.819.]

The outstanding feature of this lathe is the driving mechanism which is located directly under the spindle below the ways. Among the advantages claimed for this construction are simplicity,

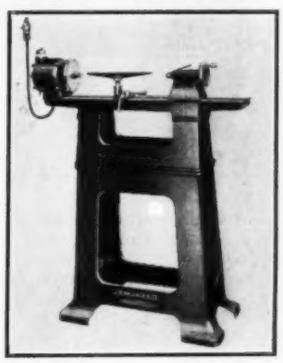


rigidity and a low center of gravity. The headstock, bed and gear box are cast in one piece, and all gears and shafts are flooded with oil from a geared pump. Three levers are used to obtain the 42 feeds and three other levers to obtain the 12 speeds. A lever is also provided for reversing the feed, together with one for changing the feed from the rod to the screw. The feed is set in inches per minute and ranges from 0.4 to 22.4 in. per minute. The arrangement of feeds and speeds covers all standard threads and many odd and special threads as well. The lathe is built in sizes from 10 to 30 in. swing.

— 62 —

Lathe, Bench, 6-In. *J. D. Wallace & Co.*, 1401 *W. Jackson Blvd., Chicago, Ill.* [A. M.,vol.59,p.229.]

This machine is for use in pattern and woodworking shops, and is self-contained so that it can be moved about the shop. The motor is built into the headstock and is totally enclosed. The armature is mounted in ball bearings and runs at 3,400 r.p.m. A toggle switch is located on the motor and a

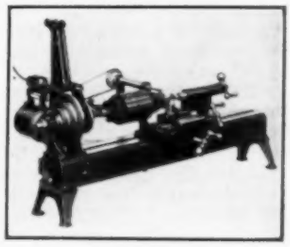


suitable cord and attachment plug are furnished. The capacity is 5 in. over the tool rest slide, 7 in. on the faceplate, and a distance of 24 in. is available between centers. Tool rests 6 and 12 in. long are provided, and a locking device is furnished on the holder. A lever clamp holds the tailstock in position.

— 63 —

Lathe and Mica-Undercutting Machine, Combination. *Hullhorst Micro-Tool Co., Toledo, Ohio.* [A.M.,vol. 59,p.638.]

This machine consists of a small bench lathe equipped with a mica-undercutting



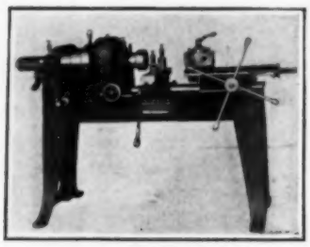
mechanism for small armature commutators. The lathe swings 6 in. over the bed, 4½ in. over the compound slide,

and will take 18 in. in length between centers. The undercutting unit is provided with an independent motor for driving the cutter, the cutter being mounted in a swinging lever arrangement which is moved by hand. The cutter is sunk into the commutator slot and drawn forward by the handle. When the handle is released the cutter immediately recedes from the slot.

— 64 —

Lathe, Turret. *Bardons & Oliver, Cleveland, Ohio.* [A. M.,vol.59,p.232.]

This lathe is particularly adapted for machining brass, iron and aluminum, or any material that is worked dry. The head and bed are cast

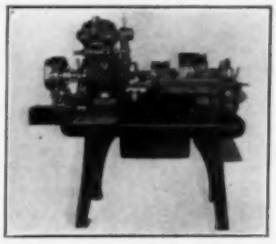


in one piece and the legs are so attached that the bed has a three point bearing. A plain or friction-geared head can be provided. Screw or lever cross feed for the cut-off slide will be furnished. The cross motion is regulated by stop screws and the longitudinal motion is given by a micrometer screw. The turret is hexagonal and the slide has longitudinal motion only. The turret has holes to hold tools with shanks, and those with flanges can be bolted to the faces. Independent stops are provided for each face of the turret and the revolving type of stop-screw carrier is used. A special automatic chuck will be furnished if desired.

— 65 —

Screw Machine, Automatic, Motor-Driven. *Cleveland Automatic Machine Co., Cleveland, Ohio.* [A.M.,vol. 59,p.638.]

A single-pulley belt or motor drive has been developed for the line of automatic screw machines made by this company. An a.c. or d.c. motor with push button control is mounted on the head and drives the machine through a silent chain. The spindle is driven through helical gears, the shafts being mounted in ball bearings. Eight spindle speeds are available, ranging from 208 to 1,600 r.p.m. The feed mechanism is equipped with a friction clutch for idle motion speed, and a longitudinal shaft drives the feed cams through a silent chain. The stock-feeding mechanism is also improved, a standard cam being used which, by means of a spring arrangement, feeds all lengths

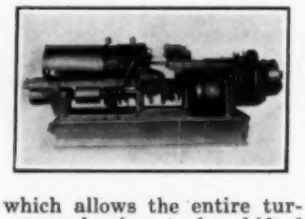


within the capacity of the machine. This spring also acts as a safety device to prevent breakage due to jamming of tools or from other causes.

— 66 —

Automatic, Six-Spindle, Long-Feed. *New Britain Machine Co., New Britain, Conn.* [A.M.,vol.59,p.678.]

This company has altered its 1¼-in. bar machine to adapt it to the making of longer pieces. An extra bracket has been added at the turret end of the bed



which allows the entire turret mechanism to be shifted endwise and, at the same time, provides space for a longer feed slide and cam. The capacity of the lengthened machine for bar stock is 1¼ in. in diameter and 12¼ in. in length. The length of the machine has been increased 24 in. by this change. The changes were made to adapt the machine to the manufacture of small armature shafts.

— 67 —

Chucking and Turning Machine, Automatic, 6-C. *Potter & Johnson Co., Pawtucket, R. I.* [A.M.,vol.59,p.781.]

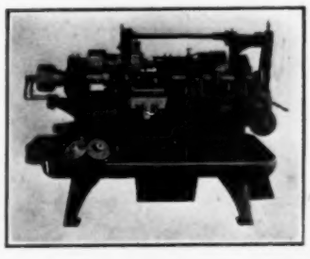
The cams of this machine are housed in the base and the headstock is built as a unit which can be removed without disturbing other parts. The unit construction is also applied to the other major parts of the mechanism. All movements of the machine are under the control of the operator by means of the hand levers at the front of the machine. The constant-speed driving pulley should run at a speed of 650 r.p.m., and there are 16 available spindle speeds, increasing in geometric ratio from 9 to 185 r.p.m. A range of 24 feeds are provided from 0.007 to 0.250 in. per rev. The cross-slide cam drum is located directly beneath the slide so that the drive is direct and this slide may be operated at the same rate of feed as the turret slide. One of the

turret ways is flat and the other is V-shaped and the slide has a hand-operated adjustment of 10 in. The length of feed available for cutting is approximately 15 in. The hp. required ranges from 10 to 15.

— 68 —

Hub Machine, Automatic. *Cleveland Automatic Machine Co., Cleveland, Ohio.* [A.M.,vol.59,p.821.]

The hub to be machined is mounted on an arbor, one end of which is held in a hand-operated air chucking mechanism. The other end is supported on a roller bearing in the tool stock spindle and the arbor is driven by a boss on the spindle hood. Three tools are clamped on an overhanging arm which is mounted on the tool stock spindle and rigidly supported in the rear. One of these turns the flange diameter, while the others rough turn the small diameter and face one end. An overhead turning attachment carries two cutters for turning the other small end, and three cutters

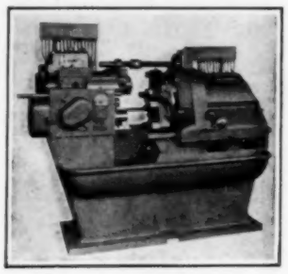


mounted in blocks on the rear cross slide rough face the flange and rough form and face one end. Four cutters on the front cross slide finish the hub, and one hub is produced at each cycle of the camshaft. The machine is driven from a single pulley with a clutch that automatically stops the machine as each hub is completed. The machine is arranged for either belt or motor drive.

— 69 —

Chucking Machine, Automatic, 6x6¼-In. *Goss & DeLeeuw Machine Co., New Britain, Conn.* [A.M.,vol.59, p.425.]

The headstock of this machine is cast integral with the base and the turret housing slides on ways machined at the other end of the bed. The turret carries five chucks and is driven by an exceptionally compact and ingenious mechanism. The feed cam is only 9 in. in diameter and an arrangement of clutches is used to change the feeding motion of the cam as

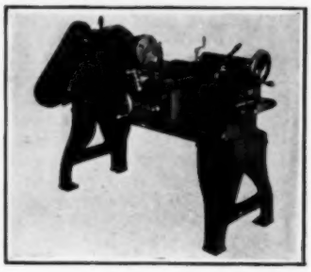


required by the cycle of the machine, in addition to indexing the turret. A safety device which makes it impossible for the turret to index until the operator has finished chucking the piece is a feature of the turret drive. The feed cam is stationary during the indexing period and this accounts for the small size of the feed cam. There are four tool spindles, and an arrangement of change gears makes it possible to change the speed of all spindles at once, or independently of each other if desired. The top spindle is arranged for threading and inside and outside threads of different pitches can be cut simultaneously. This spindle is also used for reaming. The taps and dies are guided into the work by lead screws.

— 70 —

Lathe, Taper Turning. *The Lynd-Farquhar Co., 419 Atlantic Ave., Boston, Mass.* [A.M.,vol.59,p.161.]

The main feature of this lathe is the upper or auxiliary bed, arranged to swivel about a point midway of its length, and upon which the

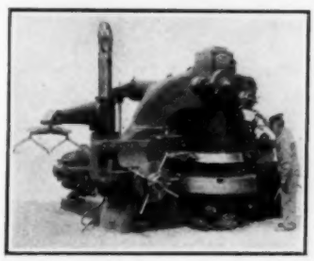


ways for the headstock and tailstock are machined. The carriage is mounted on ways on the main bed. For turning tapers the headstock and tailstock are unclamped and the upper bed is swung out of parallel. The live and dead centers always remain in line at all angles. Designed for plain turning upon small diameters, the lathe has neither lead screw, change gears nor back gears. The feed shaft is driven from the spindle through a chain and sprockets. The lathe swings 16 in. over the ways and 5½ in. over the carriage. A distance of 16 in. is available between centers.

— 71 —

Lathe, Car Wheel, Vertical. *Niles-Bement-Pond Co.*, 111 *Broadway, New York, N. Y.* [A.M.,vol.59,p.676.]

This machine is intended for use on rolled wheels as they come from the hot-working operation, and the operations consist of turning

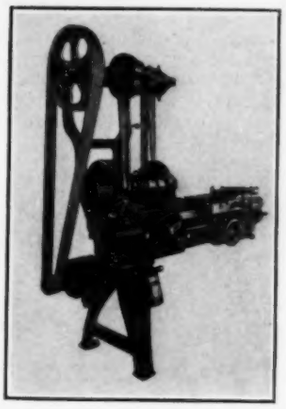


the contour of the tread and flanges, facing the hub and rim on one side, bossing eccentric hubs where such exist, undercutting the rim and scribing the wear line. The wheel is mounted upon a heavy rotary table, and a square tool bar slides vertically in the housing, carrying the tools for facing and bossing the hubs. Two side heads are provided and have power feeds as well as hand adjustment. A special motor provides power down-feed and traverse in both directions to the vertical tool bar. A variable speed motor with a 3 to 1 range is direct-connected to the machine and drives the work table. It is stated that this lathe reduces the number of machines required for the operations mentioned by nearly 60 per cent.

— 72 —

Drive, Motor, for Carroll & Jamieson Lathes. *The Carroll & Jamieson Machine Tool Co., Batavia, Ohio.* [A.M., vol.59,p.196.]

The driving countershaft is mounted in a frame which is hinged at the top of a vertical bracket. The shaft is raised or lowered by a vertical member which swings the frame and is actuated by an eccentric lever. The motor is mounted on a special bracket bolted to the back of the lathe leg and drives the countershaft through a belt. A friction

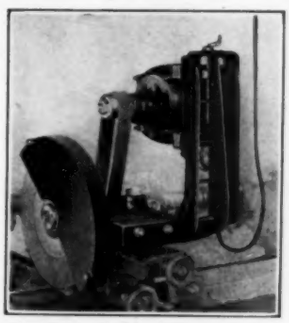


clutch is provided in the upper cone. A 1½-hp., constant speed motor running at 1,200 r.p.m. can be furnished.

— 73 —

Grinder, Lathe. *Wilkie Machine Works, Winona, Minn.* [A.M.,vol.59,p.310.]

This self contained unit is adapted to be fastened to the carriage of a lathe by means of a plate which is machined to fit the tool post slot. The motor is mounted on a frame above the spindle and is arranged to be raised and low-

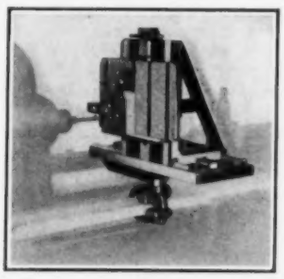


ered. Wooden belt pulleys are furnished for the motor shaft and suitable guards are provided for the grinding wheels. The spindle is hardened and ground and mounted in adjustable bronze bearings. The wheels are mounted on special locking collets, and the standard wheels are 6 and 10 in. in diameter.

— 74 —

Attachment, Spacing and Boring. *C. C. Craley Manufacturing Co., Shillington, Pa.* [A.M.,vol.59,p.930.]

This device consists of a base to be attached to the carriage of the lathe, an angle plate which slides along the base, and a work holding plate vertically adjustable on the face of the angle plate. The work is



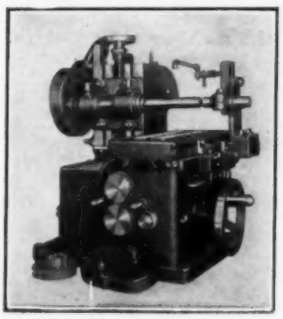
therefore universally adjustable in relation to the spindle center, and clamps are provided to hold the parts of the device in position when properly set. Accurate positioning is accomplished by means of standard gage blocks used in connection with accurate wedges attached to the apparatus. The wedges are hardened, ground and lapped, and graduated to read in thousandths. A zero point on the work plate is opposite the spindle center without the blocks in position and with the wedges at zero, and the work is attached to the plate in a definite position in relation to this datum point. The blocks and the wedge adjustment are then used to position any part of the work accurately in relation to the spindle. Fifteen standard blocks are furnished, sufficient to give all adjustments within the capacity of the device.

Milling Machines

— 75 —

Milling Machine, Bench, Semi-Automatic. *Weed Engineering Works*, 738 *Union Ave., Bridgeport, Conn.* [A.M.,vol.59,p.347.]

This small milling machine is especially useful in the manufacture of small parts for fire-arms, sewing



machines, typewriters and similar work. The drive shaft is fitted with a tight and loose pulley and runs at 300 r.p.m. The arbor is hardened and ground and is dogged to the spindle which has a No. 7 B. & S. taper. The working surface of the table is 3¾ x 12 in. and the feeding length is 10 in. The feed trip lever is operated either by hand or by dogs on the table for semi-automatic operation, and 4 changes of feed are available from 1.145 to 5.26 in. per min. There are six changes of spindle speed. All speed and feed changes are accomplished by means of change gears. The machine is equipped with tight and loose pulleys and a convenient belt shifter. The 6-in. driving pulley runs at 300 rev. per minute.

— 76 —

Milling Machine, Slot, Wedge Block. *The Harrington Co., 17th and Callowhill Sts., Philadelphia, Pa.* [A.M.,vol.59,p.495.]

This combination drilling and milling machine is designed especially for machining the T-slot in locomotive driving box adjustment wedges. A drill spindle at one side, equipped with hand and power feed, is used to drill two holes on close centers, suitable guide strips and stops being provided on the table. Two milling spindles are provided, one of which carries an end mill

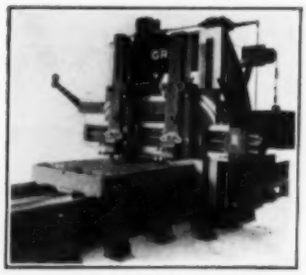
and the other a T-slot cutter. The drilled wedge is mounted in a fixture and fed past the cutters which remove the metal in the slot which remains after the drilling operation. The feed motion is power-driven and the table can be moved in and out and raised or lowered by hand. A base extension is provided for mounting the motor, which is belt-connected to the machine. The motor should preferably be of the adjustable speed type.

Planers and Shapers

— 77 —

Planer, Long Reach, Twin-Rail. *The G. A. Gray Co., Cincinnati, Ohio.* [A.M.,vol. 59,p.492.]

This planer is designed for work which requires a longer reach than is available with the regular planer and for very heavy cutting. The main feature of the machine

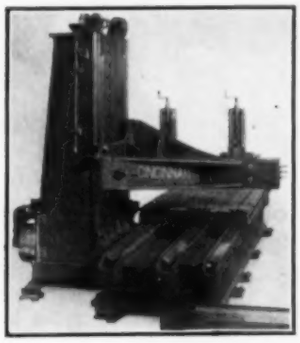


is the twin rail which is built up of two members securely bolted together and moving as one unit. The saddles are mounted on this rail in such a manner that the weight of the heads comes on the upper member, so that the lower section remains straight and the head always moves parallel to the table. The saddle also bears against the rear of the upper member, giving the stiffness required by the long reach. The driving and feed arrangements are the same as furnished on the regular line of Gray planers. The capacity of the planer is up to 66-in. width, 44-in. height and 16-ft. length.

— 78 —

Planer, Open-Side, 3-Way. *Cincinnati Planer Co., Cincinnati, Ohio.* [A.M.,vol.59, p.817.]

The main feature of this planer is that the table is

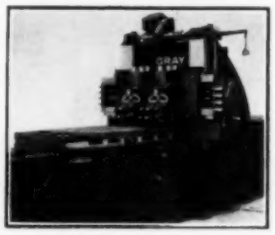


supported on three ways instead of the usual two. Two of the ways are V-shaped and one is flat, giving wide support to the box table, which is also equipped with a table clamp and inner guides. The ways are lubricated by a force feed system which employs a reversible pump to force the oil into the ways directly under the cutting tools. The rail is of the extended type and the knee is securely doweled and bolted to it. The heads are equipped with rapid power traverse in all directions and the rail has a power elevating device. The column is braced and ribbed on the inside to prevent distortion and is held in position on the base by a large tongue, cast integral with the base, in addition to the bolts. This tongue fits a groove in the column. The side head also has a rapid power traverse.

— 79 —

Planer, Switch. *The G. A. Gray Co., Gest & Depot Sts., Cincinnati, Ohio.* [A.M.,vol. 59,p.822.]

This special-purpose planer is designed for machining heavy railway switches and is made exceptionally heavy and rugged for the service required. The two major operations in switch planing are taking simultaneous cuts on the sides of the rail heads and cutting off the flange. By operating two clutch levers at the right-hand end of the rail, the desired amount of feed to the heads for the first operation is obtained by turning one crank and, at the end of the operation, a single pull on the traverse lever causes the heads to move apart quickly. The

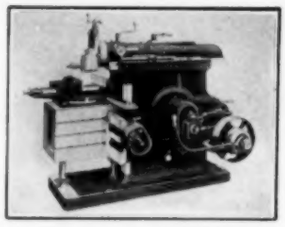


other operation is equally easy to accomplish and since the control is so simple, the operator is able to keep his eyes on the tools and the work. The heavy upthrust of the tool is not borne by the pin upon which the apron swings but upon a shoulder at its lower end. The table gears are of steel throughout and the main portion of the drive is of the balanced helical type. The gears run in a bath of oil. A complete automatic oiling system is provided, by which oil is pumped to the ways and to the drive shaft bearings.

— 80 —

Cross Feed, Automatic, for Heavy Service Shapers. *American Tool Works Co., Cincinnati, Ohio.* [A.M.,vol. 59,p.348.]

With this device the feed occurs only during the return stroke of the ram and throughout the entire stroke. It may be engaged, disengaged or reversed through the manipulation of one conveniently located lever. Fifteen feeds are provided from 0.010 to 0.150 in. per ram

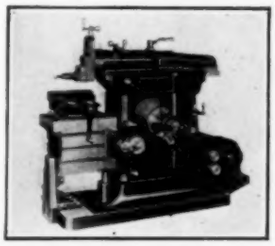


stroke. Each feed is clearly indicated on a graduated dial and can be secured while the machine is in operation. An automatic safety device is one of the features of the mechanism.

— 81 —

Shaper, Balanced-Ram, Averbeck. *Steel Products Engineering Co., Springfield, Ohio.* [A.M.,vol.59,p.496.]

A 28-in. and a 32-in. size have been added to this line of shapers, and all sizes can now be furnished with a

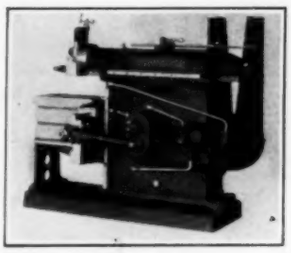


single-pulley, constant-speed drive. A selective type gear box provides eight cutting speeds, ranging from 6 to 103 strokes per min. The balanced ram is a feature of the machine and is intended to reduce the friction load. The table is of box form and has a roller outboard bearing. The power cross feed provides 16 feeds ranging from 0.008 to 0.125 in. per stroke. Adjustable stops for the feed action are provided.

— 82 —

Shapers, Climax. *Cincinnati Shaper Co., Cincinnati, Ohio.* [A.M.,vol.59,p.893.]

All speed and driving gears of this line of shapers are placed inside the column and all operating levers can be conveniently reached by the operator without leaving the operating position. The gear chamber in the rear of the column forms a reservoir for lubricating oil, and contains gears which provide eight selective changes of



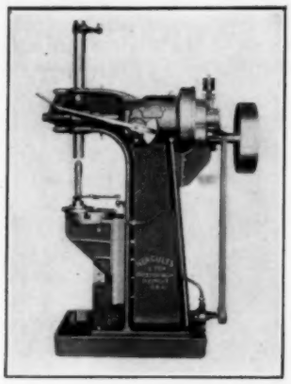
speed, from 11 to 138 cutting strokes per minute. The feeding movement is actuated by cams instead of the usual ratchet, an arrangement which gives a good feeding movement and confines all the movement to the return stroke of the shaper. Eleven feeds ranging from 0.010 to 0.170 in. per stroke, are available. The ram is of the V-type, and the ways of the tool slide are made with the male member of the dovetail in the head. The table is an almost complete box section and the vise will fit either the top or sides. The lubrication system consists of a pump in the gear case which delivers oil to a distributing station at the top of the column from where it flows to all parts of the machine. Seven models of these shapers are built.

Presses

— 83 —

Press, Power and Broaching. *Hercules Mfg. Co., 446 E. Woodbridge St., Detroit, Mich.* [A.M.,vol.59,p.491.]

This is an improved design of the machine previously manufactured and has a capacity of 15 tons. Power is delivered to the ram through gearing and a double friction clutch. The ram is 3 in. in diameter and has a travel of 24 in. The fast speed of the ram up or down is 50 ft. per min., and the pressure feed downward is 84 in. per min. Broaches are made with 60-deg. ends which fit an adapter on the end of the ram. Either belt or motor drive is furnished. All speeds are controlled by one lever and any pressure up to the capacity of the machine may be obtained at will.

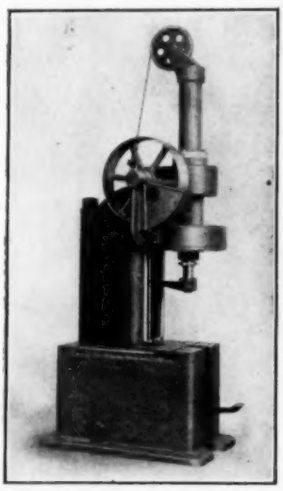


A reservoir for lubricating oil is located in the base and a suitable pump and piping is provided.

— 84 —

Press, Power, "Flexible." *Fox Machine Co., Jackson, Mich.* [A.M.,vol.59,p.637.]

The column of this press rests on the base and the ram case is fastened to the top of the column. The flexibility of the drive is obtained by the use of a friction mechanism operated by a treadle. The treadle operates a friction brake through a system of levers and the

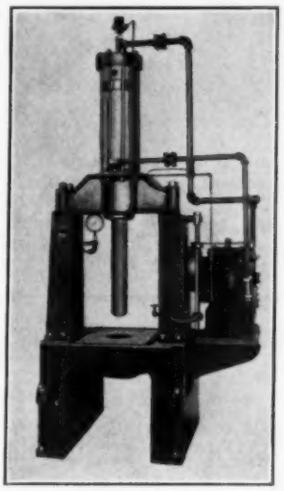


action of the brake band, by arresting the motion of the brake drum, causes the ram to descend. The ram is rotated by a long steel sleeve in which it is keyed, the sleeve being driven through a steel worm which meshes with a phosphor bronze worm gear secured to the sleeve. The press is built in two sizes of 8 and 20 tons capacity, respectively. The stroke of the ram is 18 in., the maximum distance from the nose of the ram to the table being 20 in. The entire drive is enclosed in a grease case. The base is slotted under the center of the ram to receive flanged shafts and work of a similar nature.

— 85 —

Press, Hydraulic, Double-Column, Self-Contained. *The Oilgear Co., Milwaukee, Wis.* [A.M.,vol.59,p.896.]

This press is equipped with the Oilgear type W pump, noted elsewhere in these columns, and various



control devices may be furnished for the pump, including plain hand control, a treadle, or a semi-automatic control. A differential quick advance is provided by which the ram is advanced at double the pressing speed. It is said that the pump is so protected that the ram may be run against a positive stop without injury. The machines are available with widths between the columns of from 24 to 36 in., and with heights of platen above the floor either 14 or 30 in. The press is made in several sizes from 15 to 50 tons in capacity. A 5- to 7-hp. motor running at 1,200 r.p.m. is recommended for motor driving.

— 86 —

Press, Hydraulic. *The Watson-Stillman Co.,* 50 *Church St., New York, N. Y.* [A.M., vol.59,p.966.]

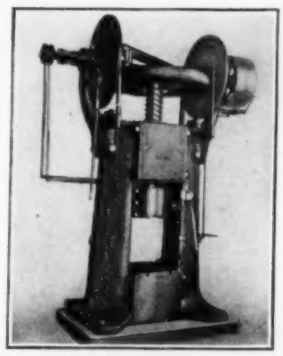
The pump of this machine is motor-driven and is so ar-

ranged that the movement of the ram through the idle portion of the stroke is rapid, and the change from low to high pressure for the working part of the stroke is effected automatically. The whole table can be removed, leaving an open-jaw machine for general shop use. The frame is a steel casting and the base serves as a reservoir for the pump. The copper-lined cylinder is bolted and keyed to the frame, and the ram has a positive stop which prevents overtravel. Hydraulic pressure is used only for the downward stroke, the return being accomplished by means of a counterweight located in the frame. Spring type centers can be furnished for holding work to be straightened.

— 87 —

Press, Power, Percussion, No. 20. *Zeh & Hahneman Co.,* 182 *Vanderpool St., Newark, N. J.* [A.M.,vol.59,p.605.]

The capacity of this press is 400 tons and the length of stroke is 20 in. The distance between the diehead and the base at the bottom of the stroke is 14 in. and the bed area is 27 x 27 in. The press will operate at a speed of 12 strokes per min., and requires 20 hp. The diehead is attached to a screw 11 in. in diameter, at the top of which is fastened a heavy flywheel which can be put into contact with either of two friction disks. To produce the pressing action the flywheel is started and speeded



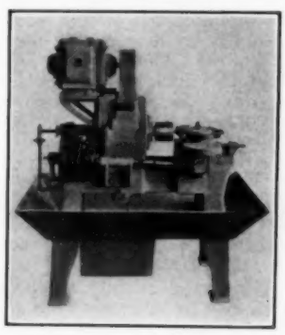
up by the disk, gaining energy rapidly as it descends. This energy is put into work on the piece under the diehead as the flywheel is stopped.

Threading Machines

— 88 —

Threading Machine, Automatic. *Rickert-Shafer Co., Erie, Pa.* [A.M.,vol.59,p.344.]

This single-purpose machine is adapted for automatically threading spark



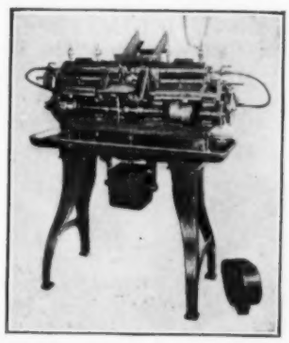
plug shells and similar work The self-opening diehead is carried in a spindle mounted in Gurney ball bearings, and is moved to and from the work by a cam. The work is carried in a revolving fixture which is automatically indexed. The threaded piece is automatically ejected. Either motor or countershaft drive is available. In the motor drive arrangement the motor drives the machine through a silent chain.

It is claimed that the machine will thread 28 pieces per min. and one operator can handle two machines.

— 89 —

Threading Machine, Double-End. *Grant Mfg. & Machine Co.,* 90 *Silliman Ave., Bridgeport, Conn.* [A.M.,vol.59,p. 493.]

This machine is designed to simultaneously thread both ends of rods up to ⅝ in. in diameter and 9 in. in length. The threading is done by self-opening dies on opposed spindles. The ma-



chine is entirely automatic, taking the rods from a hopper and delivering them to a chute at the rear. The automatic features are actuated by cams. The driving gears are enclosed and run in oil.

The camshaft extends along the front of the machine so that the cams are easily accessible for adjustment when changing the size of the work.

— 90 —

Tapping Machine, Oscillating, Pneumatic. *W. Gaterman Mfg. Co., Franklin and 15th Sts., Manitowoc, Wis.* [A.M.,vol.59,p.496.]

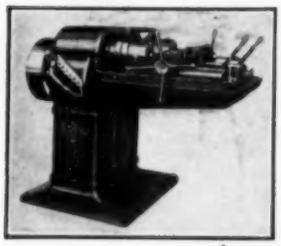
A pneumatic control for the oscillating action of this machine has been designed to replace the former electro-

magnetic device. It is stated that the pneumatic control delivers greater pressure on the clutches, thereby increasing the capacity of the machine. The oscillations of the tap are started when the torque reaches a desired maximum amount and continue until the resistance is overcome. The action does not occur unless the resistance offered exceeds the torque for which the driving mechanism has been set.

— 91 —

Threading Machine, Double-Spindle, 1¼-In. *Geometric Tool Co., New Haven, Conn.* [A.M.,vol.59,p.818.]

This machine is similar to the ¾-in. size described on p. 388, vol. 54, of the *American Machinist*. It is designed for threading work in which the threading time for each piece

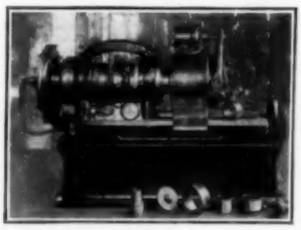


is sufficient to allow the operator to chuck and start a second piece while the first is being completed. Both spindles may be fitted with die-heads for external threading, or with collapsible taps for internal work. A high-speed tapping attachment can be furnished for holes too small for collapsible taps. The spindles are driven by a single pulley but may be driven independently by means of change gear levers which also control the spindle speeds. The machine will cut threads of five sizes from ¾ to 1¼ in. The recommended countershaft speed is 296 r.p.m. and a 6-hp. motor is required for motor driving.

— 92 —

Milling Machine, Thread, Planetary. *Hall Planetary Thread Milling Machine Co., Inc., Bridesburg, Philadelphia, Pa.* [A.M.,vol.59,p.270.]

In this machine the piece upon which the thread is being cut is held stationary while the cutter revolves about it. At the head of the machine the drive shaft carries a sprocket which drives the cutter spindle through a silent chain. The cutter spindle revolves in bearings

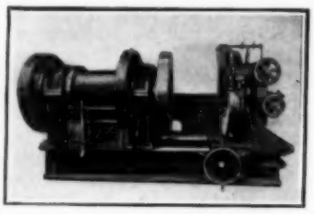


inside an eccentric sleeve, which is in turn mounted in another sleeve. The amount that the cutter is thrown off center is determined by the angular relation of the sleeves. In operation the sleeves revolve together, being driven through worm gearing and giving the planetary motion to the cutter. The cutter is fed longitudinally by means of a master screw. The work is held in an air chuck which is bolted to the bed when properly located.

— 93 —

Threading and Cutting Machine, Pipe, 18-In. Landis *Machine Co., Waynesboro, Pa.* [A.M.,vol.59,p.192.]

The range of this machine is from 8 to 18 in. and the entire range is covered by one die-head and one set of chasers. The design is similar to

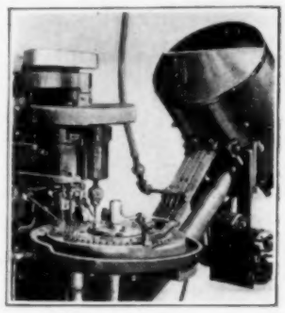


the 12-in. size described on p. 34, vol. 56. A single pulley drives the machine through a gear box which gives eight spindle speeds. A friction clutch in the spindle drive is operated by convenient levers. At each end of the hollow spindle there is a 3-jaw independent chuck and the rear chuck has grips for holding flanges. The carriage is traversed by power or hand and automatic stops are provided.

— 94 —

Hopper Feed for Dial Tapping Machine. *Anderson Die Machine Co., Iranistan Ave., Bridgeport, Conn.* [A.M., vol.59,p.196.]

This hopper feed is for use on the dial tapping machine manufactured by this company and described on p. 155, vol. 56. The hopper mechanism is driven independently by a motor. There are three chutes leading from the hopper, and the mechanism insures proper feeding of the pieces to the dial, when it is stationary. As the dial moves



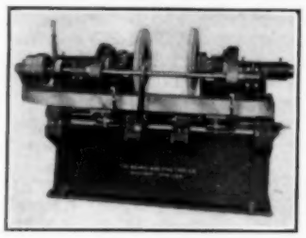
the ends of the chutes are automatically closed. A positive ejector forces the finished pieces from the dial.

Other Machine Tools

— 95 —

Buffing Machine, Crankshaft. *Morris Machine Tool Co., Court and Harriet Sts., Cincinnati, Ohio.* [A.M.,vol. 59,p.569.]

The machine used for buffing the crank pins of a 4-throw crankshaft is shown in the illustration, one machine being required to buff the pins on each center. Another similar machine is used to buff the main bearings, making a total of three machines for a 4-throw shaft. The buffing wheels are made of hard felt about 24 in. in diameter, and pulverized glass is used for a polishing

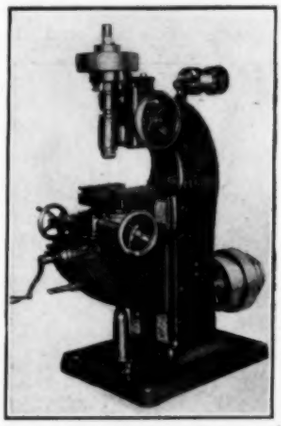


material. The wheels are mounted on ball bearings in slides arranged to be moved transversely by means of the short levers at the front of the machine. The table carrying the shaft driving heads can be moved longitudinally. The driving heads are driven by a two-step cone pulley through a friction clutch.

— 96 —

Die-Sinking Machine, No. 4, Becker. *The Reed-Prentice Co., Worcester, Mass.* [A.M., vol.59,p.820.]

This machine is an adaptation of the standard Becker No. 4-B milling machine to the needs of the die-sinker. Instead of the usual table the machine has a special vise mounted upon the upper sliding member and arranged to be rotated through a com-



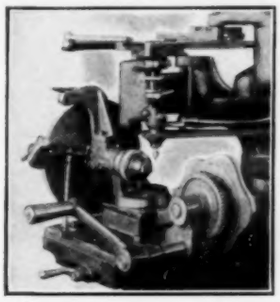
plete circle. The capacity of the vise jaws is 9x7 in. and the slide can be moved 14 in. in each direction. The knee may be elevated through 19 in. and the spindle head has a vertical movement of 5 in. The spindle is belt-driven and 12 speeds are available through a 3-step cone and reduction gearing. The speeds range from 11½ to 680 r.p.m. The hole in the spindle is ⅞ in. in diameter and the threaded spindle nose has a No. 10 B&S taper hole.

— 97 —

Graduating Attachment for Engraving Machines. *Geo. Gorton Machine Co., Racine, Wis.* [A.M.,vol.59,p.230.]

This attachment is for use with Gorton engraving machines. A sliding head located on a cast iron base is propelled past the cutter by

a cam mechanism. The work is located on a draw-bolt through the head. Adjustment is provided for the dimension between the lines and mechanism is provided for graduating sections of a circle. The head swivels so

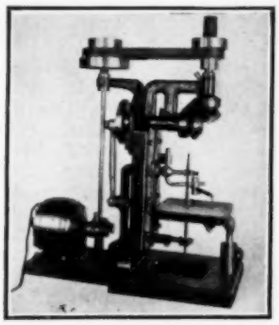


that the cutter can operate on surfaces at any angle up to 90 deg. The feeding cam is rotated through a gear and pinion by means of a hand crank and the lengths of the lines are determined by the heights of the cam points.

— 98 —

Filing Machine. *Flint Manufacturing Co.*, 1016 *Merril St., Flint, Mich.* [A.M., vol.59,p.192.]

A feature of this machine is the fact that all bearings are above the work table and away from the file dust. A

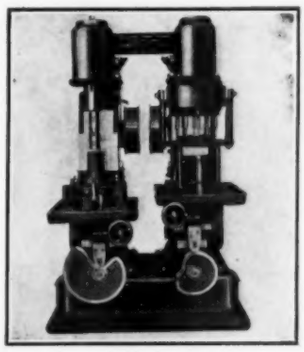


vertically reciprocating crosshead is arranged to carry various sizes and shapes of standard files and is driven by a crank on a horizontal shaft. This shaft is driven by a belt and a bevel gear from the vertical motor shaft. The stroke of the file is adjustable about two axes. Another type of machine adapted to be placed on a drill table and driven by the drill spindle is also made.

— 99 —

Production Unit, "M-G." *Meldrum-Gabrielson Corp., West Fayette and Niagara Sts., Syracuse, N. Y.* [A.M., vol.59,p.671.]

This machine is adapted for production on automobile parts and can be applied to drilling, reaming, tapping, boring, turning, milling and other operations. Two columns are mounted on a common base and are connected at the top by a tie-bar. The mechanisms on the two columns are independent. Each machine is driven by a single pulley and a 5-hp. motor can be mounted on the back of each column, if desired. The work is held on the table in a suitable fixture and the table slides vertically on the column, its movement being obtained by means of the cam at the front of the base. Inside each driving pulley is an expanding clutch, operated by a lever on the side of the head. Sliding gears and change gears provide four spindle speeds. The spindle is mounted in ball bearings and the face of the spindle

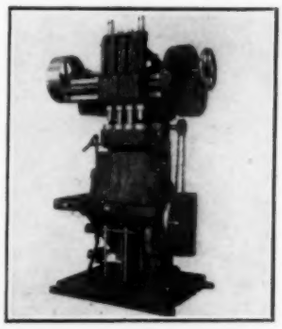


is flush with the head. The gearing in the feed-cam train provides two feeding speeds, and the feed can be thrown out of engagement at will. A coolant pump and piping are provided. A series of these machines can be used to do all the operations on a particular part and two operations on the carrier of a differential are being performed on the machine illustrated.

— 100 —

Lapping Machine, Cylinder. *Moline Tool Co., Moline, Ill.* [A.M.,vol.59,p.157.]

The machine illustrated has four heads, but the number

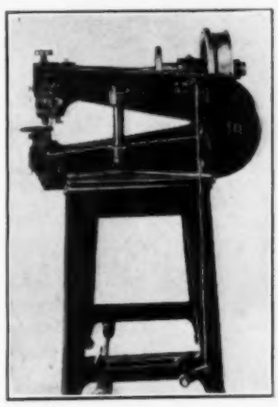


can be varied to suit any cylinder block. Each spindle has a spiral gear and all the gears mesh with a long horizontal gear in the cross rail. This gear is driven through slip gears for changing the speed of the spindles. The reciprocating motion is imparted to the spindles by the use of a crankshaft and connecting rods from the same kind of motor as that for which the cylinder is intended. The cylinder block is mounted in a fixture on the table and elevated to the working position of the laps. The fixture is standard equipment and honing or lapping tools can be supplied.

— 101 —

Nibbling Machines. *Andrew C. Campbell, Inc., Bridgeport, Conn.* [A.M.,vol. 59,p.605.]

Two additional styles of these machines for rapidly cutting irregular outlines in sheet steel are now on the market. The machine operates on the principle of a punch press, having a small piercing punch with a long

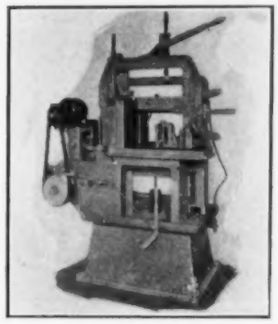


pilot which is never withdrawn from the die after starting a cut. The No. 1-B machine, shown in the illustration, has a 24-in. throat and will cut mild steel plate up to $\frac{1}{4}$ in. in thickness. The No. 2 will cut plates as thick as $\frac{3}{8}$ in. and can be used for cutting cam blanks for automatic screw machines, and similar work.

— 102 —

Saw, Shaping, Universal, 13-In. *The Peerless Machine Co., Racine, Wis.* [A.M.,vol. 59,p.69.]

In addition to a blade clamping apparatus which puts the saw blade under 10,000 lb. tension, the blade is backed up by a saw-steel thrust plate 0.048 in. thick which assists in keeping the teeth in line. A dual-control feed mechanism is provided which saves time for the operator. A stop rod for automatically stopping the saw at the completion of the cut or at a predetermined depth is a part of the saw frame mechanism. The vise table is 42 in. above the floor and is the upper part of the bed which is bolted to the base of the machine. The height of the front jaw is 15 in. and an auxiliary front jaw or angle plate, 10 in.

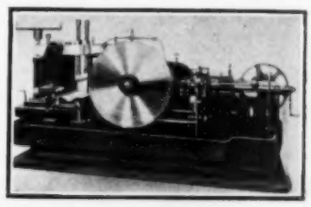


wide, is located on the other side of the saw blade to align the work. A three-speed sliding transmission provides for 45, 80 or 125 strokes per min. The 1- to 1½-hp. motor is mounted on a bracket. The capacity is 13x13 in. and the net weight is 2,200 pounds.

— 103 —

Sawing Machine, Metal. *Cochrane-Bly Co., St. James St., Rochester, N. Y.* [A.M., vol.59,p.193.]

This machine carries a 37-in. saw which may be revolved so as to give three cutting speeds, 30, 40 and 50 ft. per min. The drive shaft speed is 300 r.p.m. and a 200-hp. motor is required. The machine has sufficient capacity for cutting 13-in. round, 12-in. square, or 10x15-in. rectangular sections. The feed screw is directly in line with the saw arbor and as close to the line of the saw as possible. The regular vise has two hand-operated clamping screws but an air-operated vise can be fur-



nished. A feeding mechanism with suitable gearing makes it possible for the operator to easily handle a 12x12-in. billet, it is claimed. The machine weighs 12,600 pounds.

— 104 —

Sawing System, Metal, "Rapidor." *Mfd. by Edward G. Herbert, Ltd., Manchester, England. Sold in America by the Tinius Olsen Testing Machine Co., 500 North 12th St., Philadelphia, Pa.* [A.M., vol.59,p.674.]

The main feature of this

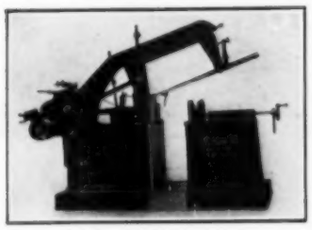
system is an unusual design of hacksaw blade in which the teeth have a set which extends below the bottom of the teeth, making it possible to sharpen the blade until after the original teeth have been entirely ground away. A special form of grinding

machine has been developed to handle these blades by means of which the teeth are automatically ground to shape. The blades are moved up to the wheel in contact with models of the correct contour. The blades contain 18 per cent tungsten and are hardened throughout. The "Rapid" sawing machine manufactured by this company has been revised in many particulars to take advantage of the speed and power of the new blades. The machine can be operated at a speed of 170 r.p.m. and applies a heavy pressure to the blade.

— 105 —

Saw, Gap, 13x16-In. *The Peerless Machine Co., Racine, Wis.* [A.M.,vol.59,p.677.]

The feature of this machine is the frame or bed, a section of which is arranged to be moved forward on a machined pad giving an excess work-holding capacity of 24 in. in height and 16 in. in width. When the gap is closed the saw can be used for ordinary purposes. The work can be clamped either



to the vertical face of the bed or directly upon the base when the gap is open. Finished pads are provided on each side of the base for convenience in locating work. The head and feed mechanism is the same as that used on the standard 13x16-in. machine manufactured by this company and previously described on p. 790, vol. 46, of the *American Machinist*.

— 106 —

Screw Slotter, Automatic. *Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.* [A.M.,vol.59,p.194.]

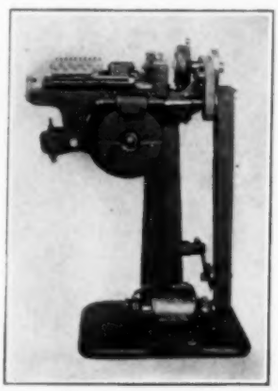
This machine is built in three sizes which will slot screws of various diameters and lengths up to 1¼ in. in diameter and 4 in. long. The blanks are placed in a hopper and fed by a suitable mechanism to a slide, down which they move to an in-

dexing dial. The blanks are fed to the dial one at a time and are clamped at the slotting position. The slotting saw is carried in a hinged frame above the dial and two speeds are available. A burr remover operates on the blank after slotting. The machine can be driven by belt or motor. The depth of cut is adjustable and a spring buffer under the saw frame is provided to reduce chatter.

— 107 —

Swaging Machine, Taper Pin. *The Langelier Mfg. Co., Providence, R. I.* [A.M.,vol. 59,p.494.]

This automatic machine takes wire from a coil, straightens it, swages the taper and cuts off the pins at the rate of 35 pins per min. A Langelier No. 0, A.S. type,



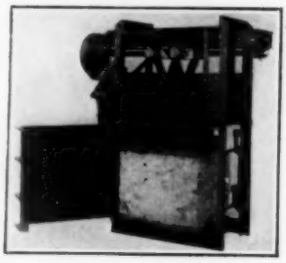
swaging machine is mounted at one end of the upper surface on which a double sliding head is arranged to slide. The main portion of this head carries gripping jaws and a roll straightener for the wire, the secondary or feed section being mounted on the main head. The heads are operated by cams. This machine makes pins from 0.032-in. wire in any length up to ½ in., and by the use of proper collets may be adapted for other sizes and lengths, if required.

Other Machines

— 108 —

Baling Machine, Toggle, Motor-Driven. *The Galland-Henning Mfg. Co., Railway Exchange Bldg., Milwaukee, Wis.* [A.M.,vol.59,p.195.]

This machine is self-contained and motor-driven and the principal feature of the pressing apparatus consists of a toggle mechanism, the links of which are operated



by two heavy nuts threaded on a large horizontal screw at the top. The screw is driven through gearing by a motor. The sides of the box are hinged to provide easy access to the finished bale. Two sizes are made, the smaller of which will press a bale 36x24x26 in. The larger size produces a bale 50x24x 26 inches.

— 109 —

Bender, Angle and U. *D. A. Hinman & Co., Sandwich, Ill.* [A.M.,vol.59,p.195.]

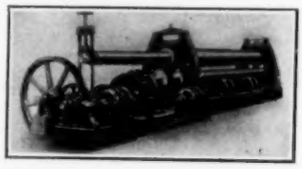
This device is hand-operated and, with regular equipment, is designed to bend round and flat stock to any angle. With special blocks,

hooks and U-bends of various forms can be bent. For not bending the machine will handle flat stock up to 2x2½ in. The maximum capacity for cold stock is 2x2½-in. flats, and ¾-in. rounds and squares. It will also handle angle iron when properly cut out at the bending point.

— 110 —

Bending Roll, No. 9. *Hilles & Jones Works of the Consolidated Machine Tool Corp. of America, Rochester, N. Y.* [A.M.,vol.59,p.673.]

This exceptionally heavy machine will handle plates up to 1⅝ in. thick and roll them to relatively small diameters. It is of the heavy-duty, hinged-housing type. The distance between the housings is 26½ ft., so that plates 26 ft. long can be rolled. The rolls are made of open-hearth rolled steel and the housings and all driving gears are steel castings. Worm gearing is provided for raising and lowering the upper roll and is so designed



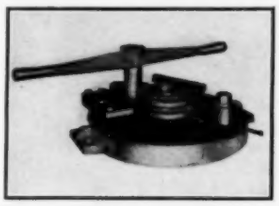
that either end can be raised or lowered independently of the other. The machine has two speeds. The lower rolls are mounted in bronze bearings and two heavy roller supports are also provided near their centers. The upper roll has an extension which serves as a counterbalance when the rear housing is dropped down for the removal of plates rolled to full circles. One 125-hp. and one 60-hp. motor are required.

— 111 —

Bender, Pipe and Tube. *Pedrick Tool & Machine Co., 3638 North Lawrence St., Philadelphia, Pa.* [A.M.,vol. 59,p.860.]

A face plate mounted in the base of this device has teeth upon its periphery, and is driven by a pinion turned by means of a hand lever. The resistance stud is mounted on a plate attached to the casing, and the face-plate carries a stud near its edge, the radial position of which may be adjusted by means of a setscrew. A grooved roll of the proper size for the bend to be made is mounted on a heavy stud at the center, and the

angle of the bend is determined by the angle through which the faceplate is turned. The machine is built in sizes which will handle pipe up to

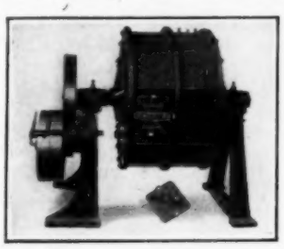


4 in. in diameter, and it is stated that thin tubing as well as pipe can be bent, without upsetting or buckling.

— 112 —

Burnishing Barrel, Improved. *Abbott Ball Co., Hartford, Conn.* [A.M.,vol. 59,p.896.]

The improvements on these machines include a guard for the driving gears and a belt shifter. Another improvement, designed to facilitate the washing out of the bar-



rel, is a strainer cover with a number of ½-in. holes in it. The cover is fitted with a piece of wire cloth on the inside, of the proper mesh to retain the smallest balls used. The strainer cover is used in place of the regular cover when rinsing out or draining the liquid from the barrel. These barrels are made up with several independent units so that it is possible to run different kinds of articles in the same barrel.

— 113 —

Cleaning Machines, Metal. *Crescent Washing Machine Co., New Rochelle, N. Y.* [A.M.,vol.59,p.531.]

The model 1A machine is illustrated in Fig. 1, and will

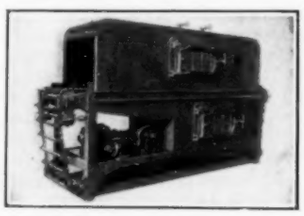


Fig. 1—Model 1A

wash parts up to 18 in. wide by 14 in. high. The larger parts are placed directly on the conveyor, smaller pieces being held in suitable racks. The washing compound tank has a capacity of 75 gal. A 1½-hp. motor drives the pump and a ½-hp. motor the conveyor. The model 2A, a

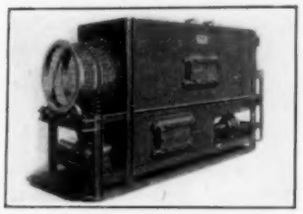


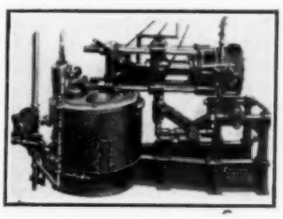
Fig. 2—Drum Type

larger machine, will handle pieces up to 26 in. wide. Fig. 2 shows a rotary-drum type which employs a perforated cylinder instead of a conveyor. One man can operate this machine, the parts falling into a tote box or other receptacle as they come from the drum. The standard revolving wash units previously described on page 314, vol. 57, are used in these machines.

— 114 —

Die Casting Machine. *Edgar N. Dollin, 6 Church St., New York, N. Y.* [A.M.,vol. 59,p.675.]

This machine is operated by air, both for closing the die and shooting the metal. The die sections are fitted to two plates one of which is held on four guide rods and the other fastened to the piston of an air cylinder. As the cylinder operates to close the die, the die is at the same time placed in position over

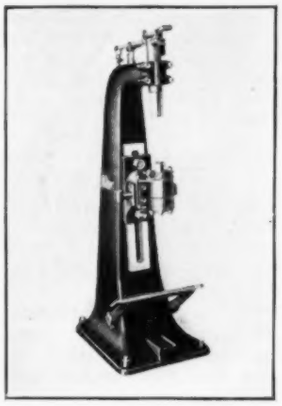


the nozzle of the goose-neck. Another valve is then manipulated to apply the air pressure for shooting the metal into the die. The goose-neck is located directly below the pot in which the metal is melted. A feature of the apparatus is the air-cylinder valve, by which a back pressure of 100 lb. per sq.in. is maintained in the cylinder as the dies are closing. The pressure applied to the cylinder is 200 lb. per sq.in., and 400 lb. per sq.in. is used for shooting the metal. The machine may be used for large or small castings and with a variety of metals.

— 115 —

Hammer, Riveting, Pneumatic. *Findlay Engineering & Manufacturing Co., Findlay, Ohio.* [A.M.,vol.59,p. 269.]

The machine is self-contained and operated by air alone. The box-section frame carries a treadle near the base which starts the hammer and operates the air valve of the cylinder which raises the anvil. The ham-



mer is clamped in the projecting arm of the frame and the anvil is carried on a bracket which is adjustable vertically on the frame. Two models are built, the larger of which will drive 1-in. hot rivets at the center of a 20-in. piece, the smaller being designed to drive ⅝-in. hot rivets at the center of a 16-in. piece.

— 116 —

Hammer, Electric, "Syntron." *National Electric Manufacturing Co., Pittsburgh, Pa.* [A.M.,vol.59,p. 309.]

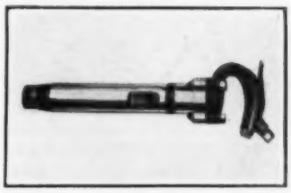
This hammer is of the solenoid type and consists primarily of a bronze sleeve in which a hardened steel piston or hammer head is oscillated by the action of two coils at the ends of the

sleeve. The piston strikes the drilling head at one end of the stroke. The hammer strikes 3,600 blows per min. on 60-cycle current. A control box is provided. The hammer head is the only part in hammer or control box that moves.

— 117 —

Hammer, Riveting. *Ingersoll-Rand Co., 11 Broadway, New York, N. Y.* [A.M.,vol. 59,p.931.]

The three sizes of this hammer can be furnished with any one of three types of barrels and with either

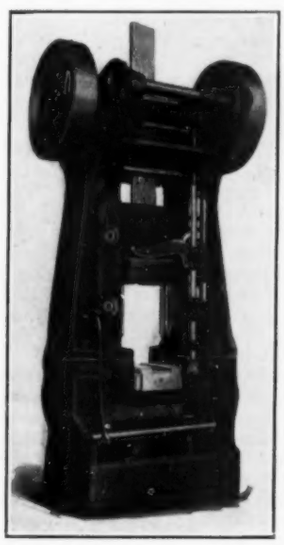


outside or inside trigger handles. The outside trigger handle is standard and is shown in the accompanying illustration. The handle is bolted to the barrel, making it easy to take the tool apart for inspection or cleaning. The throttle valve is a combination of the piston and poppet types and the control is sensitive. The hammer will deliver a heavy blow or a light tap at the will of the operator. The alloy steel valve has no holes or ports from which cracks or checks may start and operates in a strong valve box located in the head of the barrel. The exhaust takes place through the side of the barrel and the opening is fitted with an adjustable deflector.

— 118 —

Hammer, Drop, Board. *Merrill Brothers, Maspeth, N. Y.* [A.M.,vol.59,p.968.]

The upright frames of these machines are I-section steel castings, keyed and bolted to the top of the base. An improved feature of the machine is the use of adjustable and reversible ram guides, fitted in the upright frames. The guide adjust-

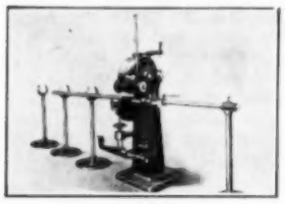


ment is simple and positive and the guides can be dropped back into the uprights to allow the removal of the ram. In the improved lifter mechanism the arrangement of sliding boxes previously used is continued. To maintain the parallelism of the rolls a compensating eccentric is provided in one of the eccentric sleeves. The hammer can be quickly adjusted to accommodate a thick or thin lifting board by changing the roll eccentric bushings. When the friction bar falls the rolls are practically locked, and this arrangement permits the use of a light friction bar, rolls the board more nearly straight and prevents excessive wear near the pick-up point. An improved safety treadle lock is provided.

— 119 —

Pipe Cutter, Roller, Geist. *Landis Machine Co., Waynesboro, Pa.* [A.M.,vol.59,p.533.]

This machine has a range from ⅛- to 2-in. pipe, inclusive. Tool steel cutters are provided and can be ground when dull. The guide rollers

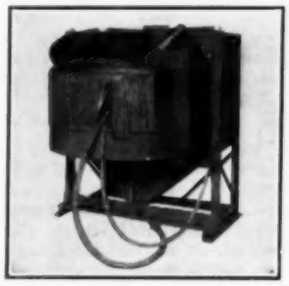


are also of tool steel and are mounted in a cage. This cage is pushed against the pipe by the combined action of a lever and pedal, thus crowding the pipe against the cutters. For the smaller sizes of pipe a small cage of rollers is fitted into the larger cage without removing the larger rollers. The machine is belt-driven and a gage for the length is provided for lengths up to 4 feet.

— 120 —

Cabinet, Sandblast. *The McLeod Co., Cincinnati, Ohio.* [A.M.,vol.59,p.967.]

This cabinet is of heavy steel construction supported by angle iron braces. The operator directs the nozzle at the work through the slit rubber curtain at the front, guiding the work by looking through the screened opening above. The interior is lighted by two electric lamps. The cast-iron table is slotted so that the unused sand falls into the hopper below, where it is reclaimed. An exhaust pipe at the top draws off the dust and spent sand. In the arrangement shown the castings are put in and taken out through the same open-

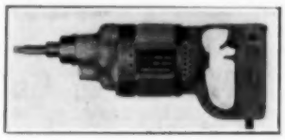


ing, but the cabinet can be built with the opening at the other end and with half the table extending outside. The halves of the table are then filled and cleaned alternately, allowing faster work by two operators.

— 121 —

Screwdriver, Electric, Lightweight. *The Black & Decker Manufacturing Co., Baltimore, Md.* [A.M.,vol.59,p.159.]

This tool is equipped with a trigger switch and pistol grip and weighs 7 lb. The motor is geared to the spin-



dle, in which the screwdriver bits are inserted and held by a spring-pressed ball in a groove. The spindle is stationary except when pressure is applied against the screw by the operator. Socket wrenches can also be supplied. The no-load speed is 350 r.p.m. and the motor will run on direct or alternating current.

— 122 —

Screwdriving Machine, Automatic. *Reynolds Machine Co., Massillon, Ohio.* [A.M.,vol.59,p.270.]

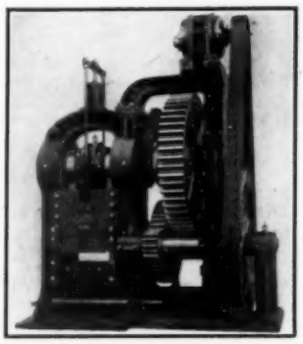
This machine is designed for short screws and screws with short bodies and large

heads, in sizes from No. 4 to No. 10 and up to ½ in. long. The screws are loaded into the hopper and no further handling is required. A 12-in. round or 14x24-in. rectangular table is furnished and screws may be driven at the center of a 14-in. circle. The spindle speed is 800 r.p.m. and the driving pulley speed 400 r.p.m. The table has a vertical movement of 2 in. without moving the bracket on the column.

— 123 —

Shears, Bar, Guillotine. *Long & Allstatter Co., Hamilton, Ohio.* [A.M.,vol.59,p.820.]

This line of improved machines is being built in a range of sizes for cutting bars from 1½ to 7 in. square. The main frame is made from a one-piece casting of box-section design, the larger

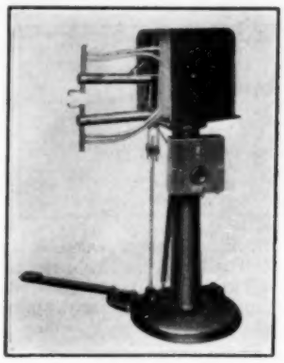


sizes being cast steel and the smaller semi-steel. The slide has a long bearing on its guides and the weight of the slide is counterbalanced. The gears are of steel with cut teeth and are placed at the side to give unobstructed access to the cutter. All gear shafts have a bearing at each end. An automatic stop always brings the slide to rest with the blades open and the clutch can be engaged only when the treadle is entirely down. The flywheel is large enough to carry the peak load of the cut and the machines are self-contained, being mounted on a substantial base.

— 124 —

Welder, Spot, Electric. *H. J. Ness Mfg. Co., 305 Broadway, New York, N. Y.* [A.M.,vol.59,p.345.]

This machine is designed primarily for operation on alternating current but can, by means of a special device, also be used on direct current. The transformer is located close to the rear end of the electrodes and it is claimed that this arrangement increases the efficiency and heats the electrodes more uniformly. The upper arm is lowered on the work, the current is turned on and the weld completed under spring pressure. The current is

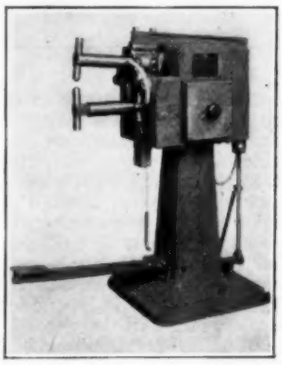


automatically turned off when the weld is completed. Height between horns, welding pressure, etc., are adjustable. The horns are water-cooled. The machine can be arranged for automatic operation using a ½-hp. motor.

— 125 —

Spot Welder, Model-100. *Thomson Spot Welder Co., Lynn, Mass.* [A.M.,vol.59,p.494.]

The welder is operated by a pedal which actuates the mechanism through a spring. It is stated that the operator cannot apply the current un-



til pressure has been applied to the electrodes. The current is automatically cut off by further pressure on the pedal after the material has reached the proper temperature. The primary coil is built to withstand high temperature and the transformer is of the "split-core" type making the removal of the primary coils possible without dismantling. The capacity of the transformer is 25 kw. The machine will weld two pieces of steel ⅛ in. thick or two pieces of brass or aluminum ⅛ in. thick.

The standard length of horns is 12 in., but either 18- or 24-in. horns can be furnished. The horns are water-cooled and may be used in raised or lowered positions.

— 126 —

Welder, Spot, Electric. *Acme Electric Welder Co., Los Angeles, Calif.* [A.M., vol.59,p.860.]

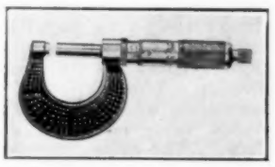
Both the upper and lower horns of this welder revolve in their holders and the lower horn also swivels on the column. The upper horn has an in-and-out movement and each end of each horn is machined to hold electrodes. The lower horn is arranged to slide vertically on the column, and all adjustments are made by manipulating one screw at the point of adjustment. A handle at the side of the column is manipulated to regulate the voltage. The electrodes are 1 in. in diameter, and both plain and water-cooled electrodes are furnished. The treadle can be swivelled to any convenient position and an adjustment before taking reading the opening between the electrodes. The machine is built in sizes of 6, 12 and 15 kw., the depth of throat varying from 12 to 30 in., and the drop of the lower horn from 8 to 24 inches.

Measuring, Gaging and Testing Equipment

— 127 —

Micrometer, Improved. *Reed Small Tool Works, Cherry and Vine Sts., Worcester, Mass.* [A.M.,vol.59,p. 606.]

The feature of this micrometer is the addition of decimal equivalents on the frame. Other features of the



standard micrometer manufactured by this company are retained. The drop-forged frame, after a special finish, is placed in high-pressure finishing dies in which the decimal equivalents are raised on the surface. The micrometer is furnished in the 1-in. size only.

— 128 —

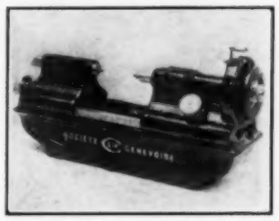
Gage, Plug, Micrometer. *Taft-Pierce Mfg. Co., Woonsocket, R. I.* [A.M.vol.59,p. 747.]

The gaging surface of this instrument consists of four shoes, bearing upon a conical plug at the center of the tool and held in place by dovetailed retaining blocks. The plug is moved endwise by a micrometer screw, the thimble of which is graduated to ten-thousandths of an inch. Adjustable limit stops operating in both directions are provided and can be set and sealed. The stop mechanism can be thrown out of action instantly when desired. All parts of the tool are hardened and ground and all working surfaces are carefully lapped. It is made in 15 sizes ranging from $\frac{5}{8}$ to $1\frac{1}{2}$ in. Each gage has a range of slightly more than $\frac{1}{16}$ in. on the diameter, so that it overlaps adjacent sizes.

— 129 —

Micrometer, Bench, Societe Genevoise. *The R. Y. Ferner Co., 1410 H St., N.W., Washington, D. C.* [A.M.,vol.59, p.823.]

These instruments are said to be accurate to within 0.00005 in., and consist of a bed upon which the headstock containing the micrometer screw may be set at any desired point. A test comparator tube made by the same company and mounted in a tailstock serves as a zero anvil, and may be adjusted by a slow motion device to obtain the final adjustment before taking readings. The micrometer screw has a range of 2 in. and the contact spindle does not revolve. Each division of the head represents 1/20,000 in., and the vernier permits readings to 0.000005 in. By

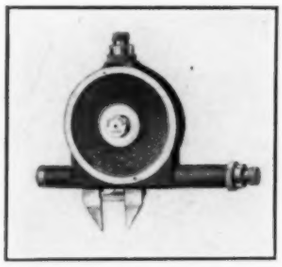


means of a mechanism which actuates a pointer the comparator tube also serves as a pressure indicator. Three sizes of the instruments are furnished, the largest having a range of 16 inches.

— 130 —

Micrometer, Gear Tooth, Zeiss. *George Scherr, 143 Liberty St., New York, N. Y.* [A.M.,vol.59,p.964.]

This instrument is designed for checking the thickness of the tooth at the pitch line and the addendum. To

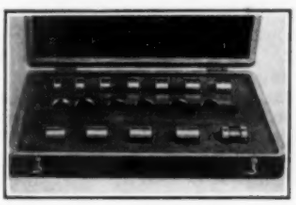


set the jaws the tool is held close to the eye so that the two scales can be seen through the small eyepiece. The scales are moved by turning the micrometer screws until the tooth thickness is indicated on the horizontal scale and the addendum on the other. The range of the instrument is from 18 to $1\frac{1}{2}$ diametral pitch, and the scales are graduated to read in thousandths.

— 131 —

Gage Set, Reference, Fractional. *The Van Keuren Co., 262 Cambridge St., Allston, Boston, Mass.* [A.M.,vol.59, p.191.]

This gage set includes the fractional inch or common



shop sizes and consists of 18 gages varying in sixteenths from $\frac{1}{16}$ to 1 in. and including the $\frac{33}{64}$- and $\frac{57}{64}$-in. sizes. A Bureau of Standards certificate of accuracy is furnished with the set.

— 132 —

Gage Blocks and Tools, Johansson. *Ford Motor Co., Detroit, Mich.* [A.M.,vol.59, p.747.]

The Ford Motor Co. has purchased the sole American rights to these gages and the methods by which they are made and will continue to market them for the benefit of those manufacturers who desire to use them for standards. These instruments were formerly manufactured and sold by C. E. Johansson, Inc., Poughkeepsie, N. Y.

— 133 —

Indicator, Dial, 4-In. *The Waltham Dial Gage Co., 85 Myrtle St., Waltham, Mass.* [A.M.,vol.59,p.460.]

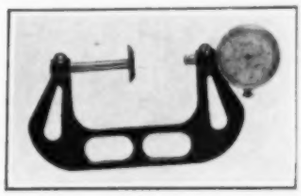
The 4-in. dial of this indicator is divided into 100 divisions, each division representing 0.001 in. A dial reading from 0 to 50 each way will be furnished on order. The dial revolves in the case and can be set in any

position by turning the knurled bezel. The $\frac{1}{4}$-in. travel of the spindle is transmitted to the pointer by a floating rack and suitable gearing. The spindle runs in hardened steel bushings. A lug on the back of the instrument has a $\frac{3}{8}$-in. hole for attaching to any machine. The weight is $3\frac{3}{4}$ pounds.

— 134 —

Gage, Stock, Round. *Federal Products Corp., 15 Elbow St., Providence, R. I.* [A.M., vol.59,p.674.]

This gage or comparator is used for checking the diameter of round stock up to 4 in. in diameter, and consists of a skeleton yoke, an adjustable anvil, and a standard Federal dial gage with reset dial and clamping screw. The anvil has a

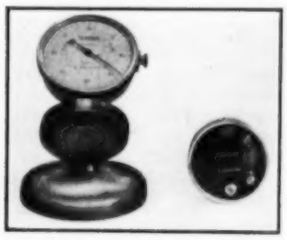


mushroom shape and the edge is bevelled. The gage is first set to a size block or trial piece by clamping the adjustable anvil in the correct position and setting the dial so that the pointer will stand at zero. Variations in the diameter of the stock can then be read directly to thousandths of an inch.

— 135 —

Gage, Dial, for Radio Phones. *Federal Products Corp., Providence, R. I.* [A.M.,vol.59,p.748.]

This gage is made for the purpose of determining the distance between the ends of the electromagnets of a

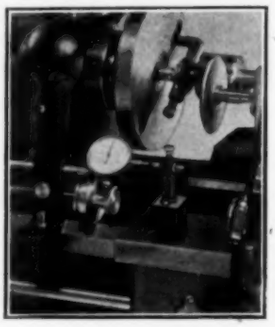


radio phone receiver and the edge of the case upon which the diaphragm rests. The device consists of a cast-iron base and a standard Federal dial gage, to the measuring spindle of which is attached the smaller of the two disks of hardened and ground steel. The outer disk is stationary relative to the gage. In gaging the large disk is placed against the edge of the case and the small disk rests on the magnets, causing the pointer to register the distance in thousandths. A radio phone receiver on which the instrument is used is shown in the illustration at the right.

— 136 —

Indicator, Spacing, Frick. *The Precision Thread Grinder Mfg. Co., Philadelphia, Pa.* [A.M.,vol.59,p.73.]

This indicator is for use on a lathe. A cast iron base carries a micrometer screw and a sliding rod on which is mounted a dial indicator. A stop pin is mounted on the lathe carriage and adapted to depress the plunger of the indicator. With this stop pin against the indicator plunger, the indicator and the micrometer dial on the screw are set at zero. The dial is then fastened to the screw and by it the required spacing is set after unclamping screw and rod. The lathe carriage is



then moved until the dial indicator reads zero. These operations are repeated for further spacing.

— 137 —

Gage, Universal. *The Waltham Dial Gage Co., 85 Myrtle St., Waltham, Mass.* [A.M.,vol.59,p.459.]

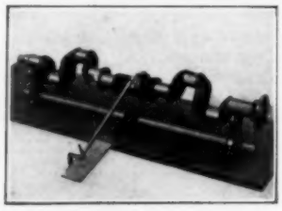
This gage mounting is used for quantity measurement of parts which must be held between limits. The base is 10x6 in., and the upright column carries an overhang-

ing arm on which a dial indicator is mounted. The arm is moved vertically by the ball crank and is clamped in position by two levers. It is especially designed for use with the 4-in. dial indicator manufactured by the same company.

— 138 —

Testing Machine, Crankshaft. *Utility Tools, Norfolk, Neb.* [A.M.,vol.59,p.784.]

The shaft to be tested is mounted on rollers fastened to the upper ends of two uprights. The uprights are placed on a heavy bar and may be shifted to various positions. For testing the parallelism of the crankpins in relation to the main bearings, an attachment called a parallelograph is clamped over the pin. As the shaft is rotated the pencil at the outer end of the parallelograph traces lines on a sheet of paper held on a



bracket attached to the horizontal rod of the device. The configuration of the lines indicates the condition of the crank, a straight line at right angles to the shaft center being satisfactory. A dial indicator may be clamped to the device for testing the main bearings.

— 139 —

Gage, Thickness. *Federal Products Corp., 15 Elbow St., Providence, R. I.* [A.M.,vol. 59,p.859.]

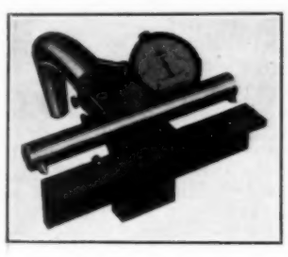
This gage is for the purpose of determining accurately and quickly the thickness of cardboard, rubber, fiber, or sheet metals.

The frame is of aluminum and is so designed that the gage may be manipulated with one hand. The measuring points are opened by pressing the button at the top of the dial, and any thickness up to 0.100 in. can be read directly from the dial in thousandths. The lower contact point is threaded so that adjustment to compensate for wear can be made.

— 140 —

Gage, Test, Thread-Lead. *Federal Products Corp., 15 Elbow St., Providence, R. I.* [A.M.,vol.59,p.860.]

This instrument is used to verify thread leads upon pieces up to 2 in. in diameter at points one inch apart up to 6 in. The body of the



gage is of aluminum and it is applied to the work by bringing the upper surface of the long slide into contact with the screw to be gaged. The slide is then adjusted on the handle until the gaging points are at the center of the screw. The tension of the gaging springs and the range of movement of the gaging points may be regulated. The gage is for comparison work only.

— 141 —

Gage Vise and Fixture, *John-Sons Gage Works, 67 Blue Hills Ave., Hartford, Conn.* [A.M.,vol.59,p.193.]

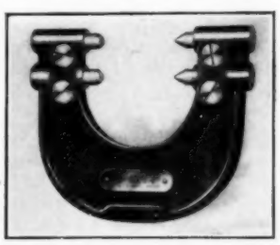
The gage fixture shown in the illustration is used with any John-Sons thread gage for work larger than 2 in. in diam. The gage is mounted on a spindle by which it is

set at any required height above the base. An arrangement of springs allows the gage to float up and down, always remaining parallel to the base. When released the gage returns to its normal position. The portion of the base upon which the work is placed is a hardened steel plate. The vise, which is not illustrated, has a lug to which various sizes of gages are clamped by a collar-head screw.

— 142 —

Gage, Snap, Improved. *Greenfield Tap & Die Corp., Greenfield, Mass.* [A.M.,vol. 59,p.347.]

The locking device is the main feature of this gage.



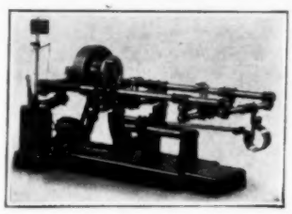
The bearing of the individual locking bushings is on a flat on the anvils so that they are held securely and prevented from turning. A stiffening

web has been added and provision has also been made for holding the gage in a stand. The frame number is cast in each frame, and a name plate is provided for special marking. Each size of gage has a wide range of adjustment.

— 143 —

Balancing Machine. "Precision." *Gisholt Machine Co., Madison, Wis.* [A.M.,vol.59, p.73.]

This machine will balance bodies up to 24 in. in diameter and 32 in. between bearings. A spring-mounted and pivoted frame carries the headstock and rollers to support the work. All revolving parts are mounted on ball bearings. In testing, the body is rotated above the "critical speed" of the frame and the drive is then disconnected, permitting a diminution of speed down to and through the critical speed of the frame. The amount of correction required is shown

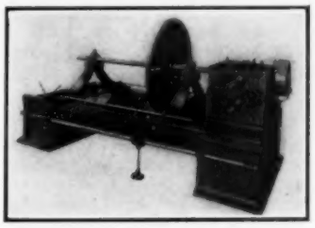


by a dial indicator. A weight in a disk at the left end of the machine is arbitrarily set to correct the unbalance and the machine is again speeded up and allowed to pass through the critical speed. The ratio between the first and second amplitudes determines the angle of unbalance and after setting this angle a third run is made. A special calculating rule is provided. The work is reversed and the correction determined for the plane initially over the pivots.

— 144 —

Balancing Machines, Static-Dynamic, Olsen-Carwen. *Tinius Olsen Testing Machine Co., 500 North 12th St., Philadelphia, Pa.* [A.M., vol.59,p.386.]

These machines are now built in sizes which will balance rotors up to 100,000 lb. in weight. The part to be balanced is mounted in plain bearings which are bolted to a vibrating bed. This bed is mounted on springs and carries the head for rotating the part to be balanced. The part is balanced at the critical speed and the amount of static and dynamic unbalance is determined in ounce-inches. The machines not only indicate the amount of unbalance statically and dynamically, differentiating between the two, but will also indicate the existence of a dynamic couple and the location of the static

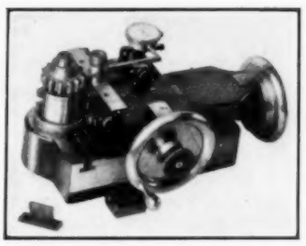


unbalance along the length of the rotor, all without stopping the machine. The vibration of the bed is detected by an indicator and the balancing weights and the angle are controlled by handwheels on the driving-head.

— 145 —

Tester, Gear. *American Grinder Co., 6534 Benson St., Detroit, Mich.* [A.M.,vol.59, p.346.]

The normal capacity of this instrument is from ½- to 8-in. spur, bevel and helical gears and the maximum is up to 12-in. spur gears. A longitudinal slide, guided in the base, carries a cross-slide on which are mounted the contact finger and an indicator. Both slides are moved by micrometer screws. The gear to be tested is mounted on a stud which is clamped in a slot at one end of the base, and for testing involute curves a base circle disk is mounted below the gear. Steel tapes are arranged to move the cross-slide as the gear is turned. If the indi-

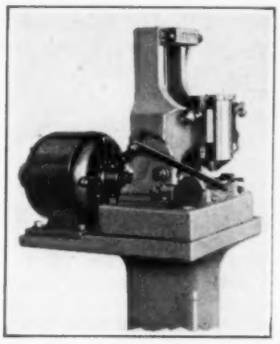


cator remains at zero a true involute is indicated and variations can be plotted. Tooth spacing is checked by using a fixed contact finger in connection with the indicating device.

— 146 —

Testing Machine, Impact. *Pittsburgh Instrument & Machine Co., 40 Water St., Pittsburgh, Pa.* [A.M.,vol.59,p. 676.]

This machine determines by means of a test specimen, the elasticity of a given kind of steel. The operation consists in subjecting a standard shape of test specimen to repeated blows of a hammer, the number of blows to fracture being recorded on a counter and the specimen being rotated a certain amount after each blow. The specimen is turned by a rack and pinion device which may be set to turn the piece through a certain angle depending on the kind of test desired. For



a "continuous" test the specimen is rotated through $\frac{1}{25}$ revolution after each blow of the hammer, and for an "alternate" test, through 180 degrees.

— 147 —

Tachoscope, Direct-Reading, O-Z. *O. Zernickow, 15 Park Row, New York, N. Y.* [A.M.,vol.59,p.155.]

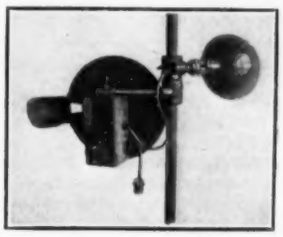
This instrument is a combined anti-magnetic chronometer and revolution counter,

with a standard time unit of 6 sec. Accurate readings of r.p.m. or ft. per min. are secured in this unit of time. In operation the spindle is held against the revolving shaft, the push button is pressed and allowed to fly back. When the pointer comes to rest the r.p.m. may be read directly from the dial. Since the push button sets the counting mechanism at zero and winds the watch movement, it is unnecessary to reset the counter after each reading. The diameter of the dial is 2 in. and the net weight is 6 ounces.

— 148 —

Rotostat *Rotostat Instrument Co., 600 West Lehigh Ave., Philadelphia, Pa.* [A.M.,vol.59,p.349.]

This instrument is used for the visual inspection of rapidly moving machine parts in detecting errors in timing of interlocking parts, unexpected interference, deformation of parts under centrifugal stresses, instan-



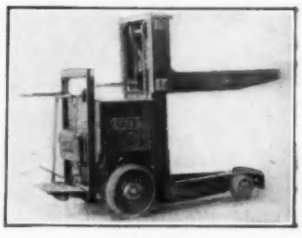
taneous and periodic speed variations and other facts of a similar nature. The device is connected to a lighting socket and the moving object is viewed through the hood. The control knobs are then manipulated until the object seems to be standing still or moving at the required speed. An adjustable lamp and reflector is mounted with the instrument on a standard, the position of the instrument also being adjustable. No special illumination is necessary.

Material Handling Equipment

— 149 —

Truck, Platform, Elevating, Model K-22. *Yale & Towne Manufacturing Co., Stamford, Conn.* [A.M.,vol.59,p. 230.]

This truck combines the advantages of a self-loading transportation unit with the ability to do high lifting, stacking or tiering. The main longitudinal frame is made in one piece of pressed steel. The lifting mechanism is of the triple spur-geared re-



duction type, electrically operated. Simple and safe operation is insured through electrical braking with mechanical auxiliary lowering-speed control, and automatic upper and lower limit stops. The spur gear unit power axle used on other trucks of this series and the standard control are provided. The majority of the individual parts and sub-assemblies are interchangeable with other models.

— 150 —

Truck, Industrial, Model K-20. *Yale & Towne Manufacturing Co., Stamford, Conn.* [A.M.,vol.59,p.231.]

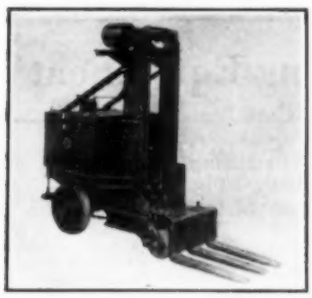
A feature of the design of this truck is that the majority of single parts and unit assemblies are standard and interchangeable with other

trucks of this series. The truck is driven through the standard spur-gear unit power axle and the standard Yale controller is used. The wheels are large and rubber-tired, and all four wheels steer. The body is suspended on springs. Auxiliary equipment available includes a gravity dump body for handling loose material and an electrically-operated swinging boom crane.

— 151 —

Truck, "Tier-Lift," Modified. *Lakewood Engineering Co., Cleveland, Ohio.* [A.M., vol.59,p.269.]

The feature of this modified form of truck is the lifting forks which make it pos-

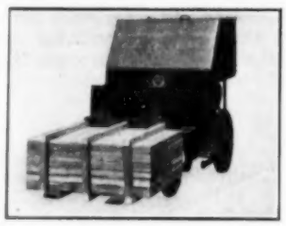


sible to pick up loads without the use of platform skids and thus save considerable vertical space in tiering. The load capacity is approximately 2,000 lb. and various maximum lifting heights are available. The driving and lifting mechanism is the same as the former model, the fork being lifted by screws which are revolved through worm gearing by a separate motor. The frame is of heavy structural steel and various types of forks can be furnished for handling different commodities or packages.

— 152 —

Truck, Lift, Fork, Electric. *Elwell-Parker Electric Co., Cleveland, Ohio.* [A.M.,vol. 59,p.348.]

This machine is essentially an electric truck with provision for carrying a 2,500-lb. load beyond the front axle. The forks touch the floor at the lower limit and may be locked at any point between the lower and upper limits. The lifting mechanism consists of a separate motor with a suitable gear reduction drive, which is assembled

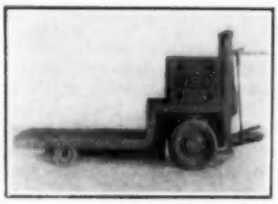


as a unit. The driving motor drives the truck through a flexible coupling and a worm and wheel on the differential of a full-floating rear axle. The drive wheels turn on 7-in. ball bearings and all four wheels steer.

— 153 —

Truck, Low-Platform, Model K-23. *Yale & Towne Manufacturing Co., Stamford, Conn.* [A.M.,vol.59,p. 349.]

This general utility truck has a load capacity of 4,000 lb. and is made up of a set of standard sub-assemblies, as are the other trucks of this series. The low-platform design reduces the amount of lifting of material necessary in loading the truck. The wheel base is 54¼ in. and the platform space is 38x60 in. The height of the platform above the ground is 11 in. All four wheels steer and are of the disk type with rubber tires. The series motor runs

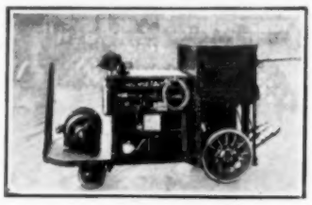


at 1,800 r.p.m., continuous rating. The frame is of pressed steel with the main longitudinal members in one piece.

— 154 —

Truck, Maintenance. *Elwell-Parker Electric Co., Cleveland, Ohio.* [A.M.,vol. 59,p.387.]

The equipment of this truck is designed to provide a quickly portable breakdown service, so that when the maintenance men arrive on the job, they will have suffi-



cient tools and material for the ordinary repairs. A steel and wood case occupies about two-thirds of the platform of a standard Elwell-Parker truck, the balance being reserved for a motor and tool kit, with room for one or two repair men to ride. The rack accommodates the usual emergency equipment and a pipe vise is mounted upon it.

— 155 —

Truck, Electric Crane. *Elwell-Parker Electric Co., Cleveland, Ohio.* [A.M.,vol. 59,p.533.]

This truck has been designed especially for use in

railroad general storerooms and places requiring similar service. The lifting mechanism and battery counterbalance the boom which is mounted on a steel column anchored to the truck frame. One drum in the hoisting mechanism is arranged to raise and lower the boom, the other handling the hook. The same motor drives both drums but they can be operated independently. The frame is of steel and all four wheels steer. Wide gage axles are provided.

— 156 —

Truck, Low-Lift, Electric. *Elwell-Parker Electric Co., Cleveland, Ohio.* [A.M.,vol. 59,p.569.]

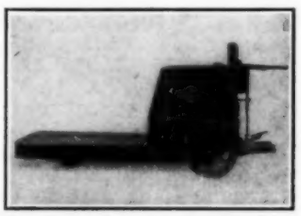
This truck has a riveted steel frame and is designed to handle material on load platforms, such as are used with hand lift trucks. The

top of the platform is made of ¼-in. steel plate and is 18 in. wide by 46 in. long. The platform is 6¼ in. above the floor in its lowered position and has a lift of 3¼ in. Three links pivoted on the frame support the platform and give it a combined rocking and lifting motion. The lifting is done by a screw attached to the platform between the links and actuated by an independent motor.

— 157 —

Truck, Platform, Elevating. *Crescent Truck Co., Lebanon, Pa.* [A.M.,vol.59,p.639.]

This truck may be used to move materials on skids or load platforms, or as a straight platform truck. The platform is 54x26 in., and is 11¼ in. above the floor in its lowered position. It rises 4¼ in. The elevating mechanism is operated by an independent motor controlled by a drum-type contr·l switch on the dash, and a limit switch is provided. The truck has four wheels, all of which steer, the 20-in. front wheels being used for driving. A G.E. motor drives the truck through a worm gear and a differential, and a Cutler-Hammer drum-type

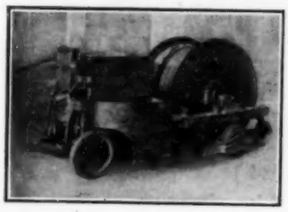


controller gives 3 speeds forward and reverse. A safety switch, integral with the controller is connected with the foot brake pedal. The capacity of the truck is 4,000 pounds and its speed when loaded is 4½ to 5 r.p.m. The brake is of the contracting type operating on the drive shaft.

— 158 —

Truck, Reel Handling. *Automatic Transportation Co,.* 2933 *Main St., Buffalo, N. Y.* [A.M.,vol.59,p.640.]

This truck is especially designed to handle large reels of wire and two long lifting arms are provided to support the reel. These arms are built in the form of a wishbone and lift the reel by means of a bar placed



through the core. By means of a "step-up" jack on each arm the truck is able to handle a variety of sizes of reels up to 84 in. in diameter. The lifting mechanism consists of a separate motor and a worm gear operating the lifting arms, and the height of lift is 4½ in. In the raised position a flat surface on the bottom of the raising wedges rests on the rollers, so that the strain is removed from the lifting apparatus. A circuit breaker and an interlocking device work in conjunction with the controller and brake.

— 159 —

Truck, Utility, G-38. *Crescent Truck Co., Lebanon, Pa.* [A.M.,vol.59,p.782.]

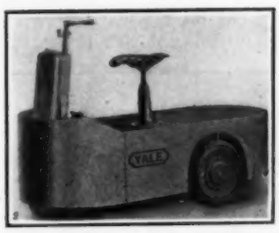
The feature of this truck is its short wheelbase which makes it especially available in restricted places. The over-all length folded is 64½ in. The standard features of the other trucks made by this

company and previously described are incorporated. The load capacity is 4,000 lb. and the platform area is 2,552 sq.in. The standard type of drive is installed and a G.E., 24-volt motor running at 1,200 r.p.m. is used. A Cutler-Hammer drum-type controller provides three speeds forward and reverse and a safety switch is connected with the operator's platform.

— 160 —

Truck, Tractor, Model K-24. *Yale & Towne Manufacturing Co., Stamford, Conn.* [A.M.,vol.59,p.349.]

The driving and control units are the same in this truck as for others in the

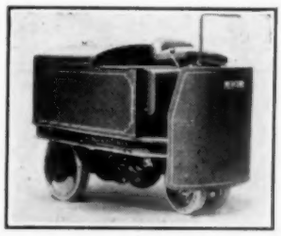


series and it is designed for hauling and small load carrying service in particularly congested spaces. The frame is of pressed steel, arc-welded into a one-piece structure which combines battery compartment, bumpers and deck, and is suspended on helical springs over each wheel. The wheels are rubber-tired, the driving wheels being of pressed steel and the front wheel a semi-steel casting. The wheel base is 42½ in., the width is 35 in. and the length 82 in. The truck weighs 2,250 lb. with an Edison battery and will, it is claimed, haul four loaded trailers, a 16,000-lb. load, at a maximum of 4½ mi. per hr. on a level roadway.

— 161 —

Tractor, Type H. *Mercury Manufacturing Co.,* 4118 *So. Halstead St., Chicago, Ill.* [A.M.,vol.59,p.640.]

The feature of this machine is the drive unit, in which the usual worm gear drive has been discarded and replaced by an internal gear arrangement. The drive is said to be considerably more efficient than the former type. The tractor is driven by a G.E. motor and a drum-type controller gives the machine three speeds in both directions. The two rear wheels drive and the front wheels are mounted close together with the body spring between

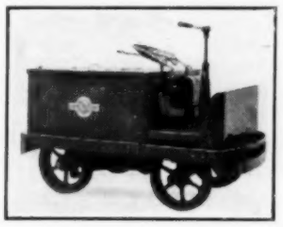


them. A service brake is applied by means of a pedal and an emergency brake operates automatically when the operator leaves the seat. The drawbar pull is given as 475 lb. normal and 1,800 lb. maximum with the 18 to 1 gear reduction, and a higher gear ratio can be furnished if a greater pull is required.

— 162 —

Tractor, Four-Wheel. *Crescent Truck Co., Lebanon, Pa.* [A.M.,vol.59,p.641.]

This tractor is designed for heavier service than the three-wheel type formerly manufactured. The rear wheels drive and the front wheels steer. The driving mechanism consists of a hardened steel worm meshing with a bronze worm wheel which drives a full-floating rear axle through a four-pinion differential. A G.E. motor furnishes the



power and a drum-type controller allows three speeds forward and reverse. A safety switch is integral with the controller and is arranged so that the circuit is broken when the driver leaves the seat. The brake is operated by a pedal. The normal drawbar pull is given as 600 lb. with an ultimate pull of 2,400 lb. The speed varies from 5 to 8 mi. per hr., according to load conditions.

— 163 —

Crane, Traveling, Push and Pull. *The Louden Machinery Co., Fairfield, Iowa.* [A.M., vol.59,p.159.]

This crane is built in two sizes with load capacities, respectively, of 1,000 and 2,000 lb. The bridge of the

crane carries a section of special Louden T-rail from which the load is suspended on a standard Louden carrier. This track may be connected with any number of overhead carrying tracks running from the craneway and a strong latch is provided to align the tracks when the load is being transferred. A safety guard keeps the load from running off the ends of the tracks. The operator pushes or pulls the load in the desired direction. The 1,000-lb. crane is built in spans up to 20 ft.

— 164 —

Hoist, Electric, Type H. *Stamp Electric Hoist Co.,* 968 *East 69th Place, Cleveland, Ohio.* [A.M.,vol.59,p. 345.]

The features of this hoist are fast lifting speed, high lift. small number of parts and accessibility. The drum is driven through two reductions of gearing and provided with a standard Weston load brake. The drum flanges fit the housing so that the cable will not run off the drum.

The motor is mounted on a bracket and drives the mechanism through a flexible coupling. A trip lever is provided to stop the motor when the hook reaches its upper limit. The hoist can be supplied for a.c. or d.c. and standard units will lift from 11 to 45 feet.

— 165 —

Hoist, Air Motor. *Ingersoll-Rand Co.,* 11 *Broadway, New York, N. Y.* [A.M.,vol. 59,p.637.]

This hoist is designated as size A and has a load capacity of 500 lb. The power is derived from a 3-cylinder air

motor which operates in either direction at any speed or load within the capacity of the machine. The motor shaft is geared to the hoisting drum. An automatic brake is provided by means of which the load is held at all times when the air supply is cut off from the mo-

tor, whether by the throttle or by failure of the air supply. The action of the brake is entirely automatic. A safety stop lever stops the motor when the load reaches the maximum height of the lift. Both motor and gears are enclosed and the motor operates in a bath of oil. The hoist weighs 150 lb., and operates on air pressures from 60 to 100 lb. The maximum lift is 15 feet.

— 166 —

Crane, Locomotive Type. *Baker R & L Co., Cleveland, Ohio.* [A.M.,vol.59,p.931.]

The regular boom furnished with this portable electric crane is 12 ft. long, but booms of other lengths can be furnished if required. The crane illustrated herewith has a 19-ft. boom for roundhouse work. All motions of the machine are electrically driven and the controls are mounted on the dash in front of the operator. Three motors are provided, one for travel, one for the hoist and one for slewing the boom. A drum type controller provides three speeds forward and reverse. The hoist mechanism consists of two drums, both driven by

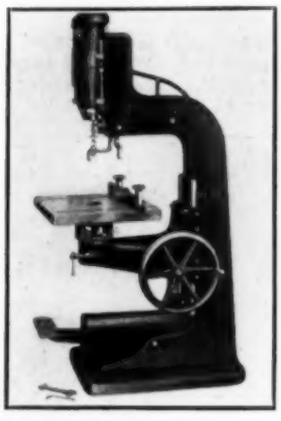
the same motor through a pair of magnetic clutches. Drum type controllers for the hoist and slewing motors are also mounted on the dash, together with a switch for the magnetic clutches. The crane will lift its rated load of 3,000 lb. at a 7-ft. radius, the lifting speed being 7 ft. per minute.

Woodworking Machinery

— 167 —

Boring Machine, Electric. Vertical, No. 72. *Oliver Machinery Co., Grand Rapids, Mich.* [A.M.,vol.59,p.310.]

This boring machine is for woodworking shops. The drilling head contains the motor armature, which is integral with the spindle, and is formed by the two halves



of the motor casing which are bolted together. The head slides vertically on guides on the frame and is moved downwardly through a maximum stroke of 6½ in. by means of a pedal. A counterbalance lever system provides connection between pedal and head, and a compression spring provides quick return when the pedal is released. The table measures 20x24 in. and can be swiveled and tilted. The distance from spindle to column is 18 in. and the vertical table movement is 14 inches.

— 168 —

Sander, Spindle, Bench. *Porter-Cable Machine Co., 1708 N. Salina St., Syracuse, N. Y.* [A.M.,vol.59,p.309.]

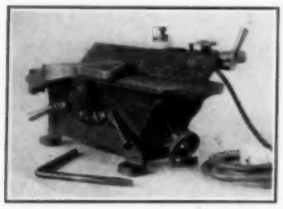
This machine is adapted to be fastened to the bench but a suitable pedestal can be furnished if desired. A G.E. motor is direct-connected to the spindle and runs at 1,725 r.p.m., an oscillating movement of 1 in. being given to the spindle by suitable mech-

anism. The spindle runs in ball bearings and is furnished with a 2½x6-in. sander roll. The table is 16 in. in diameter and can be tilted at various angles. The machine weighs 75 pounds.

— 169 —

Jointer, Bench, Motor-Driven, Portable. *The Nazel Engineering & Machine Works, Nicetown, Philadelphia, Pa.* [A.M.,vol.59,p.459.]

This jointer has two adjustable tables above which a gage or fence is supported by an arm on the main frame. An aluminum safety guard

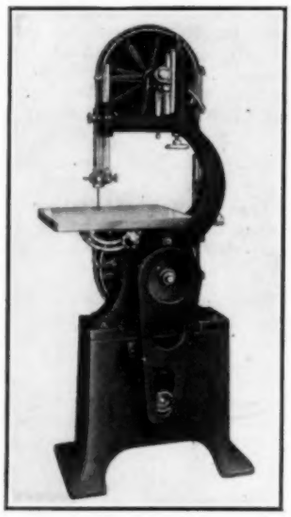


is pivoted on the table. The cylinder, which carries three high-speed steel knives, is direct-connected to the motor shaft. All rotating parts are dynamically balanced.

— 170 —

Sawing Machine, Band. *Bauer & Pease, 314 Douglas St., N. W., Grand Rapids, Mich.* [A.M.,vol.59,p.231.]

This machine is of the usual vertical type with cast-



iron base, table and wheels. The wheels are 16 in. in diameter, rubber faced, and run at a speed of 750 r.p.m. The table is 18x20 in. and can be tilted at any angle up to 45 deg. The maximum dimension under the saw guide is 7½ in. A ½-hp. motor is mounted on a swinging frame within the base and completely protected from dirt or shavings. Aluminum guards are provided for the band wheels and saw. The motor drives the lower band wheel through an endless belt.

— 171 —

Woodworker, Combination, Improved. *Buffalo Forge Co., Buffalo, N. Y.* [A.M.,vol.59, p.824.]

The important improvements on this machine include provision for quicker, simpler and more accurate adjustment of the planer

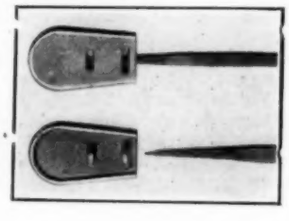
guide and the introduction of a gear drive for the rip-saw and jointer mandrel. The improved guide for the planer is arranged to slide in a slot and can also be set at an angle. The gear drive gives smoother running conditions than belting, and eliminates belt slippage. The gear ratio is approximately 2 to 1. The machine combines a circular saw, a band saw and a jointer, and each can be operated independently by means of jaw clutches. The saw and jointer tables are adjustable, and an emery wheel can be mounted.

Small Tools

— 172 —

File Handle, Metal. *Nestor Manufacturing Co., 40 West 13th St., New York, N. Y.* [A.M.,vol.59,p.72.]

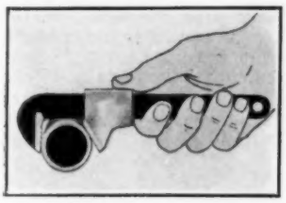
This handle is stamped from sheet steel. The edges are rolled and two straps are formed to hold the tang of the file. It will handle files up to 8 in. in length and can readily be attached and detached. The handle is 1¼ in. wide and 1¾ in. long and is suitable for practically all types of files.



— 173 —

Wrench, "Red and Ready." *Albany Hardware Specialty Mfg. Co., Albany, Wis.* [A.M., vol.59,p.162.]

This wrench is of the quickly adjustable type. It is constructed of tool steel, drop forged, properly tempered

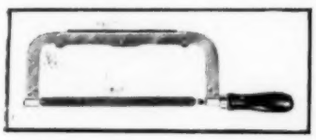


and finished in red enamel. The 7-in. size has sufficient capacity for 1-in. pipe, 1⅞-in. round bar, or ¾-in. hex nuts.

— 174 —

Hacksaw Frame, No. 26. *Consolidated Tool Works, 296 Broadway, New York, N. Y.* [A.M.,vol.59,p.271.]

This hacksaw frame is made of ⅞x⅛-in. stock to insure strength and rigidity. The depth of the frame is 3¼ in. and the length is adjustable for blades from 8 to



12 in. in length. All parts are held together when the blade is not in place. The blade is tightened by turning the handle and may be faced in four directions.

— 175 —

Wrench, Ratchet-Action. *Python Tools Co., 95 Liberty St., New York, N. Y.* [A.M., vol.59,p.570]

This wrench consists of a hollow handle from which projects a length of chain with a hook at its end, adapted to engage projections on the handle after the chain has been wrapped around the object to be turned. The handle end of the chain is then locked by

the thumb lever on the handle. An extra length of chain is provided to increase the capacity of the wrench when desired. It is claimed that the chain will not mar the surface to which it is attached. The adjustment is easy and the ratchet action of the chain is convenient in close quarters.

— 176 —

Hacksaw Blades. *Henry Disston & Sons, Philadelphia, Pa.* [A.M,vol.59,p.638.]

The "Improved Chromol" blade is an all-hard blade made from a special molybdenum steel. It is made in various lengths and thicknesses for hand use, and light and heavy machine service. The "Duraflex" is a flexible-back blade for hand frame use only, and is intended to meet conditions under which ordinary blades are frequently broken. All blades have milled teeth. Every third tooth is left with no set and is called a cleaner tooth.

— 177 —

Die Stock, Adjustable. *C. L. Frost & Son, 30 Ionia Ave., Grand Rapids, Mich.* [A.M.,vol.59,p.782.]

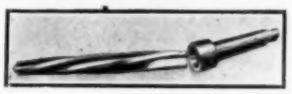
The main feature of this tool is its ability to cut threads ⅛ in. over or under size The adjustment is made by turning the handle and the amount of adjustment is shown on a scale at the side of the stock. The dies are locked in the required posi-

tion by means of a knurled thumbnut. It is stated that the construction allows the tool to be removed from the work without reversing the threading operation, permits the rechasing of worn threads, and makes possible the use of one die for more than one thread.

— 178 —

Reamers, Bridge, High-Speed. *Latrobe Tool Co., Latrobe, Pa.* [A.M.,vol.59, p.72.]

These reamers are made in both five-flute straight, and four-flute spiral types, either of which can be furnished in bridge reamer or short car reamer lengths. The body is made from a bar of high speed steel rolled to the proper profile to form the flutes when the bar is twisted, It is machine finished and hardened before assembly with the carbon steel shank. The shank is assembled on the body by a spinning opera-



tion which heats the shank sufficiently so that it can be formed by pressure. The metal flows around the reamer body and keys in the notches and flutes. Finish grinding completes the tool.

— 179 —

Tap, Spiral Flute. *Wells Corp., Greenfield, Mass.* [A. M.,vol.59,p.194.]

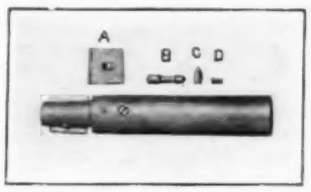
The spiral flute is the main feature of this tap and it is claimed that the cutting action of the teeth is improved. The ends of the tap are given a double chamfer for easier working and starting. The taps will be furnished with

threads ground to a tolerance of 0.0005 in. on both lead and diameter if desired. Hand taps and tapper taps are made in standard sizes, with various shanks, and up to 1 in. in diameter.

— 180 —

Reamer, Taper, Adjustable. *The Madison Mfg. Co., Spring and Elton Sts., Muskegon, Mich.* [A.M.,vol.59, p.233.]

The tool consists of a machine steel shank and a set of two taper cutter blades *A* locked together. The blades are of high speed steel and

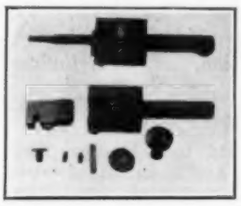


ground to the required taper. The cutters are adjusted by means of a pin *B* located in a longitudinal position in the shank and moved by a cone-point adjusting screw *C*. The small set screw *D* is used to lock screw *C* in position. An adjustment of ¼ in. is possible on the 1-in. size. The cutters may be set to float if desired and will not fall out of the shank.

— 181 —

Boring Tool, Offset, Adjustable. *Art Tool Co., 16 Montgomery St., Bridgeport, Conn.* [A.M.,vol.59,p.674.]

The body of this tool is made of mild steel, pack-hardened and ground, and the shank fits a ½-in. collet. The cross-slide fits the opening in the body which is so shaped, below the counterbore for the dial, as to present two parallel bearing surfaces, against which the slide is held by the pressure of two small coiled springs. The binding screw draws the

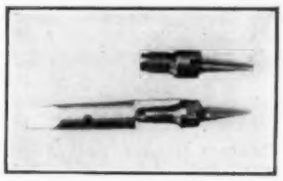


sides of the body or yoke together and holds the slide securely. The dial reads to thousandths upon the diameter of the hole being bored.

— 182 —

Cutter, Profile. *Circular Tool Co., 71 Willard Ave., Providence, R. I.* [A.M.,vol. 59,p.570.]

The threaded shank of this cutter is purposely made a loose fit in the collet so that

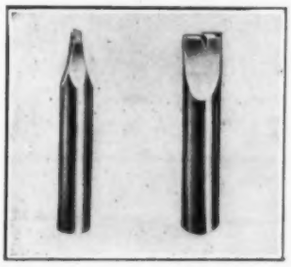


it is centered by the conical shoulder. Tapered tools, as shown in the illustration, are furnished in standard sizes ranging from ⅛ to ¼ in. in point diameter, and from ¾ to 1¼ in. in length of flute. Parallel cutters are supplied in diameters from ⅛ to ½ inch.

— 183 —

Cutters. *Economy Products Co., 50 Spring St., Newark, N. J.* [A.M.,vol.59,p. 969.]

These cutters are made for cutting keyways, slots and oil grooves, facing, die-slotting, the machining of flat bottomed holes, and similar operations. The arrangement of the cutting edges is the feature of the tools, and the sharpening of the two cutting edges is said to be comparatively simple. Repeated grinding will not affect the diameter of the cutter, and it is claimed that the design of the cutting edges gives ex-



ceptionally free cutting action. A variety of sizes are furnished with both straight and taper shanks.

— 184 —

Drill-Reamer, Twist, Combination. *A. C. Bellefleur & Son Co., 81 Hamilton St., New London, Conn.* [A.M., vol.59,p.971.]

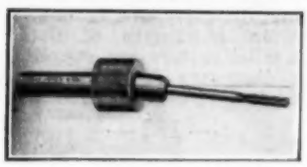
This tool is designed to drill and ream taper holes in solid material, one edge of each flute being provided with cutting teeth which cut the taper and ream the hole. The standard taper is ¼ in. per ft., and both straight and taper shanks can be fur-

nished. A variety of diameters up to 0.755 in. are made. The advantage claimed for the tool is the saving of time in drilling and reaming taper holes, as only one operation is required.

— 185 —

Reamer Holder, Self-Aligning. *Scully-Jones Co., 2012 West 13th St., Chicago, Ill.* [A.M.,vol.59,p.495.]

With this holder the reamer is held in a collet which is controlled through a

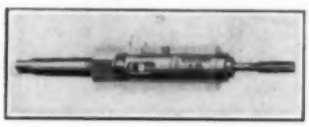


driver plate and a universal joint, the driver plate being supported by a ball which allows the collet to swing freely in any direction. A ball thrust between the collet and drive plate allows free movement of the reamer sideways.

— 186 —

Chuck Holder, Tap. *Scully-Jones Co., 2012 West 13th St., Chicago, Ill.* [A.M.,vol. 59,p.639.]

This device is so constructed that the tap is started into the work under spring pressure, and consists of a sleeve with a taper shank and a socket with a taper hole to receive the Scully-Jones "Wear-Ever" tap chuck. A square on the

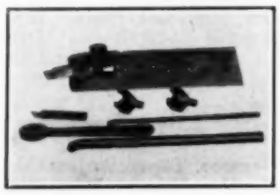


driving end of the socket fits into a corresponding square in the sleeve so that a positive drive is obtained, and a spring located back of the square end imparts a certain amount of flexibility so that the tap will operate without stripping the thread. The holder is made in four sizes.

— 187 —

Holder, Tool, X-L-N-T. *Marshall & Meier, 298 Mulberry St., New York, N. Y.* [A.M.,vol.59,p.929.]

In this holder the tool bit is held in a slot in a piece which pivots in a hole in the front extension of the shank, an arrangement which allows the bit to be swung through an angle of 180 deg. without moving the shank in the tool post. The tool is clamped under the end of a short bar, the other end of which is seated on a shoulder of the shank. A clamping screw is threaded into the

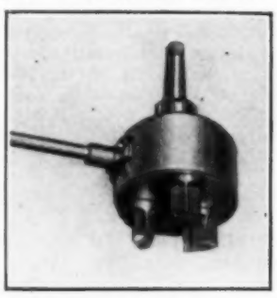


shank. Three slotted pieces are furnished with each holder, one for the large and one for small tool bits, and one for two sizes of boring bars. Three models of the holder are made for various tools up to ⅝ in. square. All parts are made of machine steel and pack hardened.

— 188 —

Milling Tool, Geometric. *Geometric Milling Tool Co., 108 N. Jefferson St., Chicago, Ill.* [A.M.,vol.59,p.72.]

This tool will drill, face and mill the six sides of a hexagon and consists of a case in which are three spindles carrying three tools.

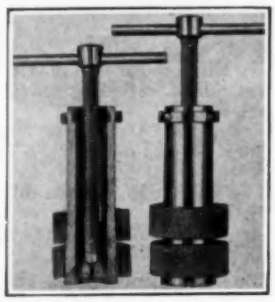


A central shaft has a taper shank to fit the machine spindle and when it is revolved, the three cutters rotate and also revolve on a fixed circle, generating cycloids. Each cutter has two cutting edges and both are demountable and interchangeable. While the tool is in operation the body is held stationary by an arm. The regular sizes are made to mill hexagons on valves and fittings of ⅜-, ½-, ¾-, 1- and 1¼-in. pipe sizes.

— 189 —

Bearing Puller. *The Campbell Auto Works, 232 N. Eldorado St., Stockton, Calif.* [A.M.,vol.59,p.197.]

This tool is designed for use in removing the inner cones of ball bearings of the open or magneto tyype. Two sizes are made, each of which



is adjustable for different sizes of bearings without other tools. The adjustment is made by the two taper rings. The small tool handles Nos. 8, 10, 12 and 13 bearings, and the larger size Nos. 14, 15, 16 and 17.

— 190 —

Tool Set, Combination, "Pal," Patternmaker's. *Hergi Mfg. Co., 250 Fifth St., Bridgeport, Conn.* [A.M.,vol. 59,p.748.]

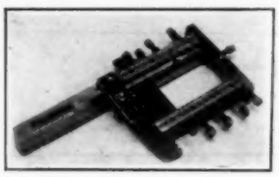
This set consists of a ¼-hp. motor, a No. 5 Hergi flexible shaft, ball-bearing handpiece and tools. The motor is mounted on a cast-iron base which has an eye by which the motor can be hung from

a hook with the shaft vertical. It can also be placed on the bench, floor or other place convenient to the work. The tools consist of 14 burrs, a grinding wheel, a sanding drum and a grinding spindle.

— 191 —

Jig, Drill, and Work Holder. *Universo Tool Corp., Kochester, N. Y.* [A.M.,vol.59,p. 816.]

This tool consists of short jaw mounted on a longer jaw and quickly adjustable in relation to it. The short jaw rests at one end against a notched bar which provides quick adjustment, and a tie-bar may be used at the other. It is also provided with clamping screws for clamping the work against the long section. Screws are also provided on the long jaw



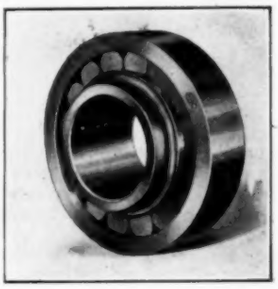
for adjustment purposes. As shown in the illustration the tool is intended for holding single pieces which have been laid out by hand for drilling operations. By the addition of a great variety of standard and special pieces the standard tool can be made to serve as a drill jig for a large range of sizes and shapes of pieces.

Miscellaneous Equipment and Supplies

— 192 —

Roller Bearing, MDW Type. *Rollway Bearing Co., Syracuse, N. Y.* [A.M.,vol.59,p. 570.]

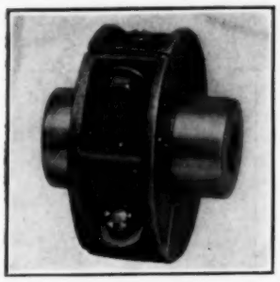
This bearing has been developed for heavy service and is supplied in various bore diameters from 0.7874 to 10.2363 in. The inner race is wider than that of the standard bearing to obviate the tendency to cut into the shaft and to allow an easier fit. The lighter fit makes removal of the bearing easier. The races are of heavy channel section and no separator is used between the rollers. The rollers are held from slipping sidewise by the sides of the races. Rollers and races are made of high-carbon, high-chrome steel.



— 193 —

Coupling, Flexible. *Charles H. Clark, 60 Grand St., New York, N. Y.* [A.M.,vol.59, p.34.]

The main feature of this coupling is its simplicity. Each hub is finished all over and has a triangular-shaped

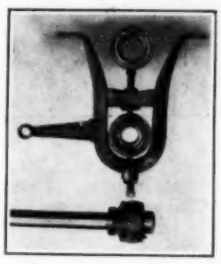


face. A housing made in three pieces encloses the hub faces. The joint between each housing section is made by a bolt fitted with a locknut and carrying leather washers at each end to provide flexibility. Further flexibility is given by the insertion of a piece of brake lining in each section to cover the acting portion of the triangle. The coupling can be furnished in various sizes. The hubs are regularly made of steel and the housing of cast iron.

— 194 —

Box, Countershaft, Roller Bearing. *St. Louis Machine Tool Co., St. Louis, Mo.* [A.M.,vol.59,p.71.]

The feature of this bearing box is the use of an adjustable taper roller bearing of proper size for the service required. Sockets for fitting to standard hangers are provided and the box can be supplied with or without a pressed steel hanger. The back of the box is solid, the

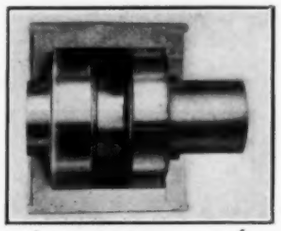


front has the usual style of end plate, and both front and back are fitted with felt washers and retainers. Collars for the shaft are furnished.

— 195 —

Pulley, Loose, Roller Bearing. *St. Louis Machine Tool Co., St. Louis, Mo.* [A.M., vol.59,p.158.]

This pulley is shown in part section in the illustration. It is equipped with a pair of adjustable taper roller bearings and is furnished in any size from 2½ to 22 in. in diameter. In the

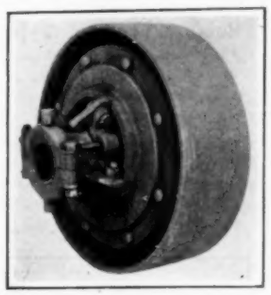


small size pulley the bearings are mounted directly on the shaft, and for the larger sizes on a sleeve.

— 196 —

Pulley, Clutch. *The Twin Disc Clutch Co., Racine, Wis.* [A.M.,vol.59,p.162.]

In this clutch the belt pulley is bronze bushed to run loose on the shaft. Saw steel driving plates faced with asbestos material, are fastened to the pulley and project between the plates of the driven member, which is splined to the shaft. The releasing levers are pivoted in a ring on the driven member. Adjustment for wear is made by turning

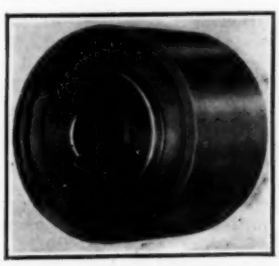


this ring on the driven member. These clutches are furnished in five sizes ranging from 6½ to 14 in. in diameter.

— 197 —

Coupling, Flexible, Falk-Bibby. *The Falk Co., Milwaukee, Wis.* [A.M.,vol.59, p.197.]

This coupling consists of two flanged disks, a tempered steel spring bent into the

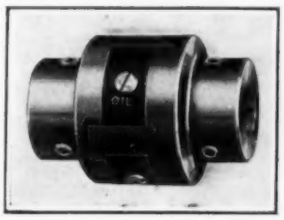


form of a cylindrical grid, and a steel shell. The spring fits into grooves in the disks, the shell is placed on the outside, and end plates are locked in by clamping rings which snap into grooves in the shell. The spring slots are machined in such a way that the stiffness of the spring increases with an increase in the load but the stress on the individual spring segments remain constant. Other advantages claimed are convenience of assembly, durability and compactness.

— 198 —

Coupling, Flexible, Higgins. *Tomkins-Johnson Co., Jackson, Mich.* [A.M.,vol.59,p. 783.]

In this coupling a flanged member is fastened to the end of each shaft and carries lugs which fit the slots in the central member which transmits the load from one to the other. The lugs fit the slots in such a way that both angular and axial misalignment are possible. The central member has an oil chamber and the oil seeps through the porous material of which the piece is made, keeping the wearing surfaces of the



coupling lubricated. When installed the middle member is left free to float endwise a small amount. The coupling will then drive without binding, cramping or backlash.

— 199 —

Chain, Silent. *Ramsey Chain Co., Inc., 1031 Broadway, Albany, N. Y.* [A.M., vol.59,p.823.]

The main feature of this chain is the joint which is designed to compensate for the slight accelerative impulse which drive chains always receive as they go into mesh on the sprocket. This compensation is accom-

plished by an actual increase in pitch of the link at half flexure, caused by the contour of the pins at the joint allowing them to move toward each other. The profile of all pins is the same, so that the joint is symmetrical and the chain will run in either direction with equal efficiency. The small angle between the pin faces and their rolling contact tends to reduce the tendency to slip and groove. The pin is held in proper relation to the link at all times, as it is carried through the outside links in which it is a driving fit, and spun over. Standard pitches from ⅜ to 1 in. are furnished.

— 200 —

Gear, Speed Reduction. *Geo. Smith Morison, 609 Chamber of Commerce Bldg., Pittsburgh, Pa.* [A.M.,vol. 59,p.857.]

The feature of this mechanism is an epicyclic roller arrangement at the high speed end. The end of the driving shaft revolves in contact with three rollers, one of which is larger than the others. These rollers contact with the inner surface of a ring which is kept from rotating by a hinge link. The two smaller rollers are carried in a cage attached to the slaw-speed driven shaft, the function of the larger roller being to hold the smaller in contact with the ring by its wedging action. This arrangement is effective for

ratios up to about 10 to 1 and for the higher ratios an epicyclic gear train is added. In this construction the ring is allowed to revolve, two gears cut on its outer face meshing with a gear fastened in the housing and one fastened to the slow-speed driven shaft. Gears of this type have been built with ratios as high as 90,000 to 1. Gears with ratios above 100 to 1 are self-locking.

— 201 —

"Viscolac." *E. J. Du Pont De Nemours & Co., Wilmington, Del.* [A.M.,vol.59,p.157.]

This material is a finish for wood or metal. It is a pyroxylin solution, developed from cotton. It is stated that the finish obtained with this material is so durable, tough and hard that it will resist high temperatures, hot or cold liquids and soap and water. It does not readily chip or crack and air-drys quickly.

— 202 —

"Macalene." *The Macalene Co., Saint Cloud, Minn.* [A. M.,vol.59,p.231.]

This material is a liquid hardening agent for cast iron and is mixed with a suitable quenching oil for use. The final hardness of the metal depends upon the ratio of the fluid to the oil in the mixture. For hardening, the metal is heated to a red heat, below the scaling point, and immediately quenched in the solution. It is claimed that castings treated with this material will measure 450 on the Brinell hardness scale and have the general properties of high carbon steel.

— 203 —

Belt Dressing, Bar, "Beltex Gripstick." *Chicago Belting Co., 125 North Green St., Chicago, Ill.* [A.M.,vol.59,p. 748.]

This dressing is furnished in 1-lb. sticks, 10½ in. long. To apply the dressing the bar is held against the pulley side of the belt. It is said to penetrate the belt and tend to eliminate the conditions which make slippage possible, that is, dryness of body and hard, glazed surface.

— 204 —

Lamp Bulb, Electric, "Theft-Proof." *Lester Kulp, 7732 N. Marshfield Ave., Chicago, Ill.* [A.M.,vol.59,p. 161.]

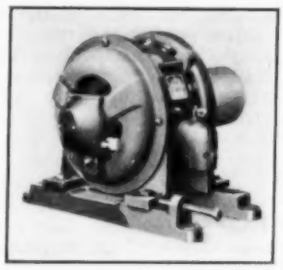
This bulb is made with a porcelain base over which is slipped the threaded sleeve which screws into the lamp socket. Before the sleeve is put on a few drops of hot

solder are place in the vertical groove in the base. When the lamp is screwed into the full depth of the socket, it is given an extra turn which shears the solder, allowing the base to turn loosely in the sleeve. The bulb can be turned either way without breaking the contact but cannot be unscrewed from the socket.

— 205 —

Motors, Induction, Type AA. *Reliance Electric & Engineering Co., Cleveland, Ohio.* [A.M.,vol.59,p.341.]

The frames of this series of squirrel cage motors, which are built in capacities from ½ to 25 hp., are of the riveted type. The stator laminations are assembled be-

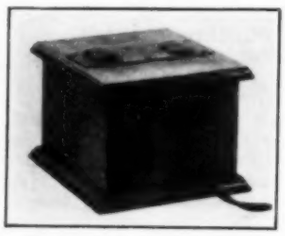


tween the end flanges, which are then riveted together and machined for the bearing brackets. The completed stator is varnished and baked after assembly. The bearings are interchangeable for both ends and can be rotated for floor, ceiling or wall mountings. The rotor end rings are cast on the ends of the bars after the bars are assembled in the rotor core. The rotors are ground to size. Fans attached to the rotor core assist ventilation.

— 206 —

Demagnetizer, Thorn. *A. J. Littlejohn, 508 East Genessee St., Syracuse, N. Y.* [A.M., vol.59,p.824.]

This instrument is designed for moderate sized machine shops and for tool rooms in which magnetic chucks are used. It operates direct from an ordinary light socket, is

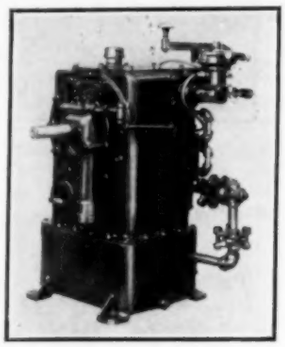


easily portable and occupies but a small space, although it is said to compare favorably with higher priced and more complicated equipment. The device is built for operation on alternating current at 110 or 220 volts.

— 207 —

Pump, Type W. *The Oilgear Co., 60 27th St., Milwaukee, Wis.* [A.M.,vol.59,p. 232.]

This compact, variable-delivery pump is designed especially for hydraulic presses and similar service, and differs from the former pumps manufactured by this company in the assembly of plungers and crossheads. The plungers are now closely coupled to the crossheads and a suction action is provided which makes it unnecessary to depend on a large auxiliary gear pump. The amount of oil delivered is controlled by a single handle and it is stated that the flow of oil is steady and free from pulsations. The maximum capac-



ity is 3,060 cu.in. per min. and the maximum working pressure is 1,000 lb. per sq. inch. It is stated that the flow of oil is free from pulsations and that the pump responds easily and smoothly to the manipulation of the control handle.

— 208 —

Pumps, Vacuum, Type 15. *Ingersoll-Rand Co., 111 Broadway, New York, N. Y.* [A.M.,vol.59,p.677.]

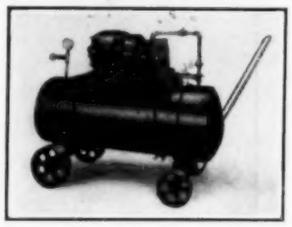
Six sizes of these small-capacity, vertical, belt-driven vacuum pumps are being marketed, ranging from 4 x 2 in. to 8 x 5 in. in the single-acting type, and with 10 x 5-

in. and 12 x 6-in. machines of the double-acting style. Self-contained units can also be furnished with motor drive, using a short belt arrangement or driving through a pinion and an internal gear. Motor-driven units are mounted on a sub-base. It is stated that the pumps will pull and maintain a vacuum of from 28.6 to 29.25 in., depending on the size. The single-acting type is air-cooled, a water circulating system being used on the double-acting machines. A "constant-level" system of lubrication is used.

— 209 —

Compressor Unit, Air, Type C, Dunning. *Geo. Sachsenmaier Co., 926 N. Third St., Philadelphia, Pa.* [A.M.,vol. 59,p.930.]

In this unit the compressor and its driving motor are mounted on a portable tank, a pressure control switch being provided to start and stop the motor at given tank

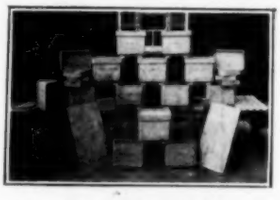


pressures. The compressor body is a single casting in which a one-piece piston is oscillated by an eccentric on a horizontal shaft. The shaft passes through the cylinder and piston at right angles and no connecting rods are required. Each end of the cylinder bore is closed by a head in which an intake and outlet valve are fitted. The pump is double-acting and runs at slow speed. Each end of the piston is fitted with three rings. The tank is tested at a pressure of 400 lb. per sq. inch.

— 210 —

Containers, Heat-Treating, "Five Armor." *The Chrobaltic Tool Co., 509 Railway Exchange Bldg., Chicago, Ill.* [A.M.,vol.59,p.162.]

These containers are for the purpose of holding high-speed tools for heat-treat-



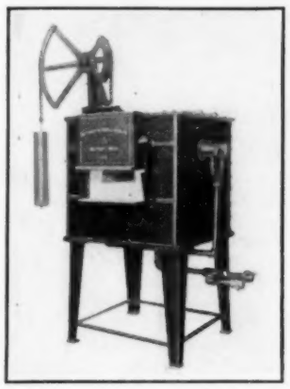
ment. It is claimed that they can be heated to 2,350 deg. F. without injury. Tools to be treated are packed in charcoal in the container and covered.

— 211 —

Furnace, Steel, High-Speed. *Beeman & Broughton Co., 458 Twenty-first St., Detroit, Mich.* [A.M.,vol.59,p.748.]

The feature of this furnace for the heat-treatment of high-speed steel is the method used to apply the heat to the tools. The furnace is fired by gas and the heating chamber is cylindrical. The flames from the burners enter tangentially

and rotate around the fire-brick hearth upon which the tools are supported and which is located at the center of the chamber. The tool rests in the center of the cylinder of flame which does not impinge upon it but heats by radiation rather than by ac-

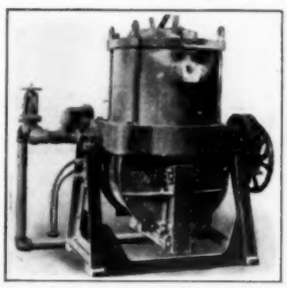


tual contact. The insulation is Sil-O-Cel and the fire-brick lining is 4 in. thick. The outer casing and the legs are of cast iron. Five standard sizes are manufactured.

— 212 —

Furnace, Induction, for Melting Non-Ferrous Metals. *General Electric Co., Schenectady, N. Y.* [A.M.,vol.59,p. 156.]

The crucible-shaped melting chamber at the top of this furnace is connected by ports to a cylindrical secondary chamber beneath it. The secondary chamber en-

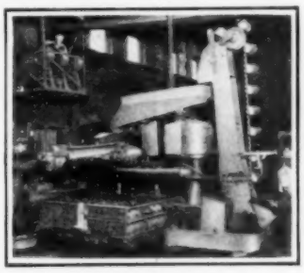


circles a primary winding and one leg of a laminated core, and is filled with molten metal which constitutes the secondary of a transformer. The heat is generated by the secondary current flowing through the molten metal, when alternating voltage is applied to the primary winding. The magnetic force of repulsion is ingeniously used to provide a positive circulation in the furnace. It is stated that the power required is not over 200 kw.-hr. per ton.

— 213 —

Sandslinger, Portable Type. *Bearsley-Piper Co., 312 Union Park Court, Chicago, Ill.* [A.M.,vol.59,p.229.]

In this machine a jointed arm is pivoted on a heavy base. The impeller head is located at the end of the arm and has a single rotating blade or bracket which

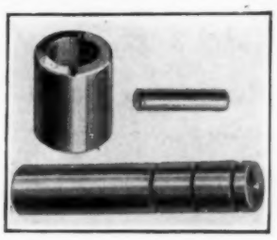


throws the sand into the mold in compact wads or handfuls. The sand is shoveled into a hopper from which a bucket conveyor carries it to an oscillating riddle mounted on the arm. From the riddle the sand flows upon a belt conveyor which takes it to the impeller head. The velocity of the sand coming from the impeller is from 2,700 to 6,000 ft. per min., and the machine will riddle and ram from 7 to 10 cu.ft. of sand per min. Three motors are used. The maximum radius of the jointed arm is 10 ft. and the machine can be picked up and moved by the crane when desired.

— 214 —

Pins and Bushings, Standard. *Danly Machine Specialties, Inc., 4911 Lincoln Ave., Chicago, Ill.* [A.M.,vol.59, p.159.]

This line of standard specialties consists of leader pins, dowel pins and bushings. The leader pins are properly hardened and ground to a tolerance of 0.0002 in. from listed diameters. They



are made in sizes from $\frac{1}{8}$ to $1\frac{1}{2}$ in. in diameter and of various lengths. Press fit allowance is made at one end. Bushings are made in straight, shoulder and extra long styles. The dowel pins are made of drill rod and are hardened and ground to within 0.0001 in. of listed diameters, and 0.001 in. oversize pins are also carried in stock. It is claimed that these dowels can be driven in or out of holes without upsetting or bulging. Fifteen sizes of standard and oversize pins are furnished.

— 215 —

Solder Pot, Bench. *J. D. Wallace & Co., 1401 W. Jackson Blvd., Chicago, Ill.* [A.M., vol.59,p.271.]

This solder pot is electrically heated and has an automatic heat control. The heating element is built below and around the container to insure an even distribution of heat, and to reduce the time necessary to melt the

material. The solder capacity of the pot is 15 lb., and the temperature is automatically held at 600 deg. The heating element requires 900 watts and the standard elements are furnished for 110 or 220 volts. Other elements can be furnished if desired.

— 216 —

Cleaner, Truck, "Tuec." *United Electric Co., Canton, Ohio.* [A.M.,vol.59,p.386.]

This vacuum cleaner is mounted in a frame which

is carried on 30-in. rubber-tired wheels. It is designed for use where a built-in system is not provided, or as an auxiliary to such a system. The $\frac{3}{4}$-hp. motor is mounted at the top, so that the rotor and fan hang in ball bearings. The apparatus weighs 280 lb. and its height is 48 inches.

— 217 —

Nut Lock, "Bull-Dog." *Waynesboro Nut Lock Co., Waynesboro, Pa.* [A.M.,vol. 59,p.310.]

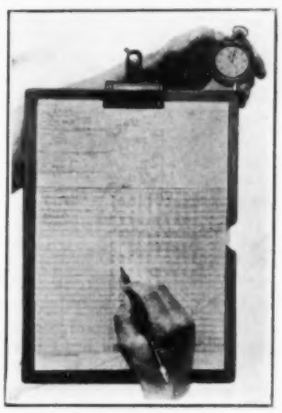
This nut lock can be applied to any bolt with an ordinary wrench and operates on the principle of the alligator wrench. Upon tightening the nut a tooth engages

the thread, and it is said the nut cannot back off, since any such tendency serves to press the tooth tighter into the tread.

— 218 —

Time Study Board, Hough. *The Stein & Ellbogen Co., 31 North State St., Chicago, Ill.* [A.M.,vol.59,p.895.]

This board provides a writing surface upon which the record blank is held by a movable clip. At the back of

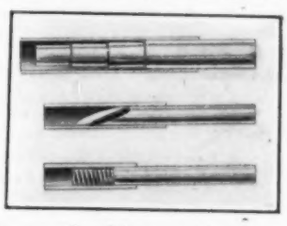


the board is arranged a storage space for data and blank sheets. The time study watch is held in such a position that it can be easily be operated by the left hand as the left arm supports the board. This leaves the right hand free for making records.

— 219 —

Protectors for Metal Parts, Fiber. *Elastoid Fiber Co., Waltham, Mass.* [A.M.,vol. 59,p.932.]

To prevent damage to metal parts with sharp cor-



ners, shoulders, edges, or threads, these fiber protectors are furnished in a variety of sizes and shapes. The protectors are to be placed over the parts after machining and to remain with them until assembled or shipped.

Index of Manufacturers

	No.	Page
A		
Abbott Ball Co., Hartford, Conn.		
Improved burnishing barrel	112	99
Acme Electric Welder Co., Los Angeles, Calif.		
Electric spot welder	126	101
Albany Hardware Specialty Co., Albany, Wis.		
"Red and Ready" Wrench	173	107
American Grinder Co., Detroit, Mich		
Gear tester	31	87
Spur gear grinding machine	145	103
American Tool Works Co., Cincinnati, Ohio		
Toolroom lathes	56	90
12-in. high duty engine lathe	59	91
Automatic cross feed for shapers	80	94
Anderson Die Machine Co., Bridgeport, Conn.		
Combined drilling and tapping machine	11	84
Hopper feed for dial tapping machine	94	96
Art Tool Co., Bridgeport, Conn.		
Adjustable offset boring tool	181	107
Atta Tool Co., Worcester, Mass.		
Bench tool grinder	46	89
Aurora Tool Works, Aurora, Ind.		
Ball-bearing upright drill	6	83
Automatic Machine Co., Bridgeport, Conn.		
Frog and switch grinding machine	36	88
Automatic Transportation Co., Buffalo, N. Y.		
Reel handling truck	158	105
Automotive Service Works, Oklahoma City, Okla.		
W & B grinding and reboring machine	35	88
B		
Badger Tool Co., Beloit, Wis.		
Surface grinder	39	88
Baker Bros., Toledo, Ohio		
No. 123 rotary drilling and boring machine	21	85
Baker R & L Co., Cleveland, Ohio		
Locomotive type crane	166	106
Bardons and Oliver, Cleveland, Ohio		
Turret lathe	64	92
Barnes Drill Co., Rockford, Ill.		
Front axle drilling and reaming machine	17	85
Bauer & Pease, Grand Rapids, Mich		
Band sawing machine	170	106
Beaman & Smith, Providence, R. I.		
Horizontal boring machine	2	83
Beardsley-Piper Co., Chicago, Ill.		
Portable type sandslinger	213	111
Beeman & Broughton Co., Detroit, Mich.		
High speed steel furnace	211	110
Bellefleur, A. C., & Son Co., New London, Conn.		
Combination taper twist drill-reamer	184	108
Black & Decker Mfg. Co., Baltimore, Md.		
$\frac{1}{4}$-in. portable electric drill	19	85
Light weight electric screwdriver	121	100
Blanchard Machine Co., Cambridge, Mass.		
Dial loading device for surface grinder	50	90
Bodine Electric Co., Chicago, Ill.		
Portable grinder	45	89
Brown & Sharpe Mfg. Co., Providence, R. I.		
Spur and spiral gear hobbing machine	25	86
No. 34 gear hobbing machine	26	86
Buffalo Forge Co., Buffalo, N. Y.		
21-in. geared drilling machine	9	84
Improved combination woodworker	171	106
Burke Machine Tool Co., Conneaut, Ohio		
Motor-driven heavy duty bench drill press	16	85
C		
Campbell, Andrew C., Inc., Bridgeport, Conn.		
Nibbling machines	101	97
Campbell Auto Works, Stockton, Calif.		
Bearing puller	189	108
Carborundum Co., Niagara Falls, N. Y.		
Aloxite remanol cut-off wheels	53	90
Carroll & Jamieson Machine Tool Co., Batavia, Ohio		
Motor drive for lathes	72	93
Chicago Belting Co., Chicago, Ill.		
"Beltex gripstick" bar belt dressing	203	110
Chrobaltic Tool Co., Chicago, Ill.		
"Five-Armor" heat treating containers	210	110
Cincinnati Milling Machine Co., Cincinnati, Ohio		
Centerless grinder	27	86
Cincinnati Planer Co., Cincinnati, Ohio		
8-ft. boring mill	5	83
3-way open-side planer	78	94
Cincinnati Shaper Co., Cincinnati, Ohio		
Climax shapers	82	94
Circular Tool Co., Providence, R. I.		
Profile cutter	182	107
Clark, Char'es H., New York, N. Y.		
Flexible coupling	193	109
Cleveland Automatic Machine Co., Cleveland, Ohio		
Motor-driven automatic screw machine	65	92
Automatic hub machine	68	92
Cochrane-Bly Co., Rochester, N. Y.		
Metal sawing machine	103	97
Colburn Works of the Consolidated Machine Tool Corp. of America, Rochester, N. Y.		
Two-spindle No. 2 drilling machine	16	85
Consolidated Tool Works, Inc., New York, N. Y.		
No. 26 hacksaw frame	174	107
Craley, C. C., Mfg. Co., Shillington, Pa.		
Spacing and boring attachment	74	93
Crescent Truck Co., Lebanon, Pa.		
Elevating platform truck	157	104
G-38 utility truck	159	105
Four-wheel tractor	162	105
Chescent Washing Machine Co., New Rochelle, N. Y.		
Metal cleaning machines	113	99
D		
Danly Machine Specialties, Inc., Chicago, Ill.		
Standard pins and bushings	214	111
Disston, Henry, & Sons, Philadelphia, Pa.		
Hacksaw blades	176	107
Dollin, Edgar N., New York, N. Y.		
Die casting machine	114	99
Du Pont de Nemours, E. I., & Co., Wilmington, Del.		
"Viscolac" finish for wood and metal	201	109
E		
Economy Products Co., Newark, N. J.		
Cutters	183	107
Edlund Machinery Co., Inc., Cortland, N. Y.		
Tilted production drilling machine	15	85
Elastoid Fiber Co., Waltham, Mass.		
Fiber protectors for metal parts	219	111
Elwell-Parker Electric Co., Cleveland, Ohio		
Electric fork lift truck	152	104
Electric maintenance truck	154	104
Electric crane truck	155	104
Electric low lift truck	156	104
F		
Falk Company, Milwaukee, Wis.		
Falk-Bibby flexible coupling	197	109
Federal Products Corp., Providence, R. I.		
Round stock gage	134	101
Dial gage for radio phones	135	102
Thickness gage	139	102
Thread-lead test gage	140	102
Fellows Gear Shaper Co., Springfield, Vt.		
Full-automatic gear grinder	32	87
Ferner, R. Y., Co., Washington, D. C.		
Société Genevoise locating and jig-boring machines	3	83
Société Genevoise bench micrometer	129	101
Findlay Engineering & Manufacturing Co., Findlay, Ohio		
Pneumatic riveting hammer	115	99

	No.	Page
Flint Manufacturing Co., Flint, Mich.		
Filing machine	98	97
Foote-Burt Co., Cleveland, Ohio		
Multiple-spindle boring machine	4	83
Ford Motor Co., Detroit, Mich.		
Johansson gage blocks and tools	132	101
Fox Machine Co., Jackson, Mich.		
Duplex horizontal multiple drilling machine	13	84
Multiple spindle drilling machine	14	84
Flexible power press	84	95
Frost, C. L., & Son, Grand Rapids, Mich.		
Adjustable die stock	177	107

G

Galland-Henning Mfg. Co., Milwaukee, Wis.		
Motor-driven toggle baler	108	98
Gardner Machine Co., Beloit, Wis.		
Semi-automatic disk grinder	28	87
Garvin Machine Co., New York, N. Y.		
No. 0 duplex horizontal drilling machine	22	86
Three-spindle duplex horizontal drilling machine	23	86
Gaterman, W., Mfg. Co., Manitowoc, Wis.		
Pneumatic oscillating tapping machine	90	96
General Electric Co., Schenectady, N. Y.		
Induction furnace for melting non-ferrous metals	212	111
Geometric Milling Tool Co., Chicago, Ill.		
Milling tool for hexagons	188	108
Geometric Tool Co., New Haven, Conn.		
1½-in. double-spindle threading machine	91	96
Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.		
Teromatic improved wheel dresser	54	90
Gisholt Machine Co., Madison, Wis.		
"Precision" balancing machine	143	103
Gleason Works, Rochester, N. Y.		
8-in. bevel gear generator	24	86
Gorton, Geo., Machine Co., Racine, Wis.		
Graduating attachment	97	96
Goss & De Leeuw Machine Co., New Britain, Conn.		
6x6¾-in. automatic chucking machine	69	92
Graham Manufacturing Co., Providence, R. I.		
18-in. face grinding machine	29	87
Pulley grinding attachment	55	90
Grant Mfg. & Machine Co., Bridgeport, Conn.		
Double-end threading machine	89	95
Gray, G. A., Co., Cincinnati, Ohio		
Twin-rail long reach planer	77	94
Switch planer	79	94
Greenfield Tap & Die Corp., Greenfield, Mass.		
Improved snap gage	142	102

H

Hall Planetary Thread Milling Machine Co., Philadelphia, Pa.		
Planetary thread milling machine	92	96
Harrington Co., Philadelphia, Pa.		
Wedge block slot milling machine	76	93
Haskins, R. G., Co., Chicago, Ill.		
Multiple-speed countershaft	51	90
Henry & Wright Mfg. Co., Hartford, Conn.		
"Viktor" drilling machine	10	84
Hercules Mfg. Co., Detroit, Mich.		
Power and broaching press	83	94
Hergi Mfg. Co., Bridgeport, Conn.		
Patternmaker's "Pal"	190	108
Hilles & Jones Works of the Consolidated Machine Tool Corp. of America, Rochester, N. Y.		
No. 9 bending roll	110	98
Hinman, D. A., & Co., Sandwich, Ill.		
Angle and U bender	109	98
Hisey-Wolf Machine Co., Cincinnati, Ohio		
⅞-in. side-handle drill	20	85
Motor-driven combination grinder and buffer	43	89
Grinder improvements	52	90
Hullhorst Micro-Tool Co., Toledo, Ohio		
Combination lathe and mica-undercutting machine	63	91
Hy-Way Service Co., Elkhart, Ind.		
Williams vertical cylinder grinder	33	87
Williams vertical internal grinder	34	88

I

Ingersoll-Rand Co., New York, N. Y.		
Riveting hammer	117	99
Air motor hoist	165	105
Type 15 vacuum pumps	208	110

J

John-Sons Gage Works, Hartford, Conn.		
Gage vise and fixture	141	102

K

Keller Mechanical Engineering Corp., Brooklyn, N. Y.		
Flexible shaft bench grinder	49	90
Kingsbury Mfg. Co., Keene, N. H.		
Semi-automatic sensitive drilling machines	12	84
Kulp, Lester, Chicago, Ill.		
"Theft-Proof" electric lamp bulb	204	110

L

Lakewood Engineering Co., Cleveland, Ohio		
Modified "Tier-lift" truck	151	104
Landis Machine Co., Waynesboro, Pa.		
18-in. pipe threading and cutting machine	93	96
Geist roller pipe cutter	119	100
Langelier Mfg. Co., Providence, R. I.		
Taper pin swaging machine	107	98
Latrobe Tool Co., Latrobe, Pa.		
High speed bridge reamers	178	107
LeBlond, R. K., Machine Tool Co., Cincinnati, Ohio		
30- and 36-in. heavy duty geared-head lathes	60	91
Littlejohn, A. J., Syracuse, N. Y.		
Thorn demagnetizer	206	110
Louden Machinery Co., Fairfield, Iowa		
Push and pull traveling crane	163	105
Long & Allstatter Co., Hamilton, Ohio		
Guillotine bar shears	123	100
Lynd-Farquhar Co., Boston, Mass.		
Taper turning lathe	70	92

M

Macalene Co., Saint Cloud, Minn.		
"Macalene" fluid for hardening cast iron	202	110
Madison Mfg. Co., Muskegon, Mich.		
Adjustable taper reamer	180	107
Marshall & Meier, New York, N. Y.		
X-L-N-T tool holder	187	108
McLeod Co., Cincinnati, Ohio		
Sandblast cabinet	120	100
Meldrum-Gabrielson Corp., Syracuse, N. Y.		
M-G production unit	99	97
Mercury Mfg. Co., Chicago, Ill.		
Type H tractor	161	105
Merrill Bros., Maspeth, N. Y.		
Improved board drop hammer	118	99
Minster Machine Co., Minster, Ohio		
No. 9 drilling machine	8	84
Moline Tool Co., Moline, Ill.		
Cylinder lapping machine	100	97
Morison, Geo. Smith, Pittsburgh, Pa.		
Speed reduction gear	200	109
Morris Machine Tool Co., Cincinnati, Ohio		
Crankshaft buffing machine	95	96

N

National Electric Mfg. Co., Pittsburgh, Pa.		
"Syntron" electric hammer	116	99
Nazel Engineering & Machine Works, Philadelphia, Pa.		
Whipple portable motor-driven bench jointer	169	106
Ness, H. J., Mfg. Co., New York, N. Y.		
Electric spot welder	124	100

	No.	Page
Nestor Mfg. Co., New York, N. Y.		
Metal file handle	172	106
Neumann's, Friedrich, Successors, Inc., New York, N. Y.		
Blau twist drill grinding machine	41	89
New Britain Machine Co., New Britain, Conn.		
Six-spindle automatic with long feed	66	92
Niles-Bement-Pond Co., New York, N. Y.		
Vertical car wheel lathe	71	93

O

Oilgear Co., Milwaukee, Wis.		
Self-contained double-column hydraulic press	85	95
Type W pump	207	110
Oliver Instrument Co., Adrian, Mich.		
No. 2 automatic drill pointer	47	89
Oliver Machinery Co., Grand Rapids, Mich.		
Oilstone grinder	44	89
Vertical electric boring machine	167	106
Olsen, Tinius, Testing Machine Co., Philadelphia, Pa.		
"Rapidor" metal sawing system	104	97
Olsen-Carwen static-dynamic balancing machines	144	103

P

Pedrick Tool & Machine Co., Philadelphia, Pa.		
Pipe and tube bender	111	98
Peerless Machine Co., Racine, Wis.		
13-in. universal shaping saw	102	97
13x16-in. gap saw	105	98
Petersen, A. H., Mfg. Co., Milwaukee, Wis.		
"Double-action" valve grinder	48	89
Pittsburgh Instrument & Machine Co., Pittsburgh, Pa.		
Impact testing machine	146	103
Porter-Cable Machine Co., Syracuse, N. Y.		
Bench spindle sander	168	106
Potter & Johnson Co., Pawtucket, R. I.		
6-C automatic chucking and turning machine	67	92
Pratt & Whitney Co., Hartford, Conn.		
Gear tooth grinding machine	30	87
16-in. lathe, model B	58	91
Precision & Thread Grinder Mfg. Co., Philadelphia, Pa.		
Frick spacing indicator	136	102
Python Tools Co., New York, N. Y.		
"Python" ratchet action wrench	175	107

R

Ramsey Chain Co., Inc., Albany, N. Y.		
Silent chain	199	109
Reliance Electric & Engineering Co., Cleveland, Ohio		
Type AA induction motors	205	110
Reed-Prentice Co., Worcester, Mass.		
Becker No. 4 die-sinking machine	96	96
Reed Small Tool Works, Worcester, Mass.		
Improved micrometer	127	101
Reynolds Machinery Co., Massillon, Ohio		
Automatic screwdriving machine	122	100
Rickert-Shafer Co., Erie, Pa.		
Automatic threading machine	88	95
Rockford Milling Machine Co., Rockford, Ill.		
Sundstrand radius, internal and surface grinder	38	88
Rockford Tool Co., Rockford, Ill.		
Sundstrand 15-in. portable geared-head lathe	57	91
Rollway Bearing Co., Syracuse, N. Y.		
MDW type roller bearing	192	108
Rotostat Instrument Co., Philadelphia, Pa.		
Rotostat	148	103

S

Sachsenmaier, Geo., Co., Philadelphia, Pa.		
Dunning type C air compressor unit	209	110
Scheer, George, New York, N. Y.		
Zeiss optical gear tooth micrometer	130	101
Scully-Jones Co., Chicago, Ill.		
Self-aligning reamer holder	185	108
Tap chuck holder	186	108
Sommer & Adams Co., Cleveland, Ohio		
Cleveland horizontal boring, drilling and milling machine	1	83
Stamp Electric Hoist Co., Cleveland, Ohio		
Type H electric hoist	164	105
Steel Products Engineering Co., Springfield, Ohio		
Averbeck balanced-ram shapers	81	94
Stein & Ellbogen Co., Chicago, Ill.		
Hough time study board	218	111
St. Louis Machine Tool Co., St. Louis, Mo.		
Roller bearing, belted, motor-driven grinders	42	89
Roller bearing countershaft box	194	109
Roller bearing loose pulley	195	109

T

Taft-Pierce Mfg. Co., Woonsocket, R. I.		
Micrometer plug gage	128	101
Thomson Spot Welder Co., Lynn, Mass.		
Model-100 spot welder	125	109
Tomkins-Johnson Co., Jackson, Mich.		
Higgins flexible coupling	198	109
Twin Disc Clutch Co., Racine, Wis.		
Model B-14 twin disc clutch	196	109

U

United Electric Co., Canton, Ohio		
"Tuec" truck cleaner	216	111
United States Electrical Tool Co., Cincinnati, Ohio		
Automatic ¼-in. electric drill	18	85
Universo Tool Corp., Rochester, N. Y.		
"Universo" work holder and drill jig	191	108
Utility Tools, Norfolk, Neb.		
Crankshaft testing machine	138	102

V

Van Keuren Co., Boston, Mass.		
Fractional reference gage set	131	101

W

Walcott Lathe Co., Jackson, Mich.		
Low-drive lathe	61	91
Walker, O. S., Co., Inc., Worcester, Mass.		
Single-stroke, vertical, rotary, surface grinding machine	40	88
Wallace, J. D., & Co., Chicago, Ill.		
6-in. bench lathe	62	91
Bench solder pot	215	111
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.		
Automatic screw slotter	106	98
Watson-Stillman Co., New York, N. Y.		
Hydraulic press	86	95
Waltham Dial Gage Co., Waltham, Mass.		
4-in. dial indicator	133	101
Universal gage	137	102
Waynesboro Nut-Lock Co., Waynesboro, Pa.		
"Bull-Dog" nut lock	217	111
Weed Engineering Works, Bridgeport, Conn.		
Semi-automatic bench milling machine	75	93
Wells Corp., Greenfield, Mass.		
Spiral flute tap	179	107
Wilkie Machine Works, Winona, Minn.		
Lathe grinder	73	93
Williams, White & Co., Moline, Ill.		
Osterholm duplex rotary surface grinder	37	88

Y

Yale & Towne Mfg. Co., Stamford, Conn.		
Model K-22 elevating platform truck	149	103
Model K-20 industrial truck	150	104
Model K-23 low-platform truck	153	104
Model K-24 three-wheel tractor truck	160	105

Z

Zeh & Hahneman Co., Newark, N. J.		
No. 20 percussion power press	87	95
Zernickow, O., New York, N. Y.		
O-Z direct-reading tachoscope	147	103

Ideas from Practical Men

Devoted to the exchange of information on useful methods. Its scope includes all divisions of the machine building industry, from drafting room to shipping platform. The articles are made up from letters submitted from all over the world. Descriptions of methods or devices that have proved their value are carefully considered, and those published are paid for.

Removing Armatures from Motors

BY A. B. SEAMAN

The device illustrated herewith is in use in the Richmond Hill shops of the Long Island Railroad, Morris Park, L. I. It consists of a bed, similar to that of a lathe, and on which are mounted two tailstocks, one

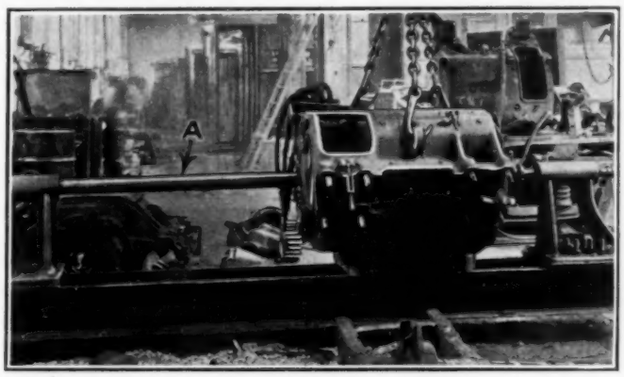


Fig. 1—Motor in place ready for removal of armature

having a very long spindle, as can be seen in Fig. 1 at *A*.

The motor from which the armature is to be removed is mounted on a carriage running upon rolls on the ways of the bed. No clamping is necessary, as the weight of the motor is sufficient to keep it from moving. Centers in the tailstocks are engaged in center holes in the armature and the spindles clamped. It only remains

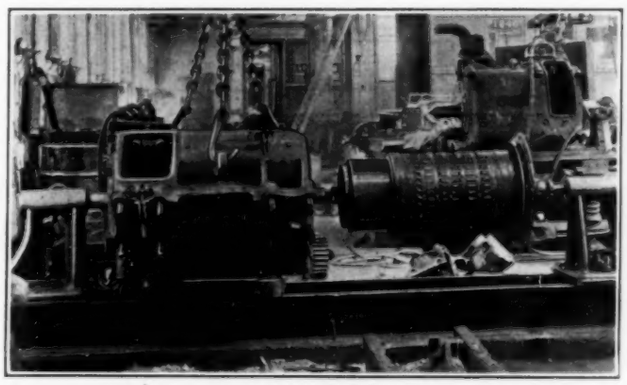


Fig. 2—Armature removed from motor

to move the carriage along the bed, carrying the motor frame with it, a distance slightly greater than the length of the armature shaft. This movement slides the frame over the armature and leaves the latter suspended on the spindles, as shown in Fig. 2, from which it can be readily picked up by the crane and traversed to any part of the shop.

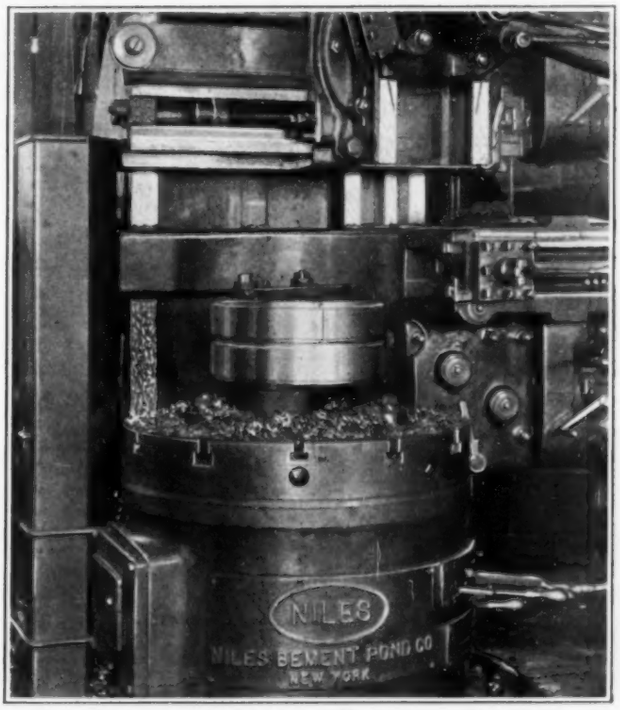
This method of removing armatures, not only saves time but avoids all danger of injury to the insulation by contact with the fields of the motor.

Turning Eccentrics

BY MATTHEW HARRIS

Generally, eccentrics are turned one at a time. Some time ago while going through the Richmond Hill shops of the Long Island Railroad, Morris Park, L. I., I noticed eccentrics being turned in pairs on a Niles vertical turret-lathe, as may be seen in the accompanying illustration.

The tool used for cutting the clearance for the strap



Turning eccentrics in pairs

flanges was wide enough to cut the clearance on the adjacent sides of the two eccentrics at once, thus the tool had to be fed in but three times to cut the four clearances.

As mounting and clamping two eccentrics in the fixture at once does not take twice as long as to mount them one at a time; and as but one setting of the turning tool is necessary, it will readily be seen that considerable time is saved by the method described.

Another advantage is, that both eccentrics will be of the same diameter.

How Hard is Steel?

BY JOSEPH HEWES

About forty years ago I was shown a method of finishing sewing-machine shuttles by cold swaging. The shuttles were drop forged. The scale was removed by pickling, and the shuttles were sized by several milling operations, enough stock being left on to allow for the swaging.

The swaging was done in a die mounted in a powerful press, and practically amounted to coining. The shuttles came from the die with a beautiful surface that required no after finishing.

After several hundred shuttles had been put through the process, it was found that each one of the last few had a very slight diagonal groove at the bottom and extending part way up both sides. Everyone present had a guess at the cause of the groove, but all the guesses were wide of the mark.

The die was taken from the press and examined under a magnifying glass, when it was found that a human hair was embedded more than half its thickness in the die, and was the cause of the groove in the shuttle.

It was easy to account for the presence of the hair in the die, but how or why the soft-steel shuttle could press the hair into the hard-steel of the die has never been satisfactorily explained.

Fixture for Milling Helical Grooves

BY FRANK RAMSEY

A device for milling helical grooves or slots, such as oil grooves on shafts or slots in tubes for controlling internal devices is shown in the accompanying illustrations. In Fig. 1, the appliance is mounted on a small

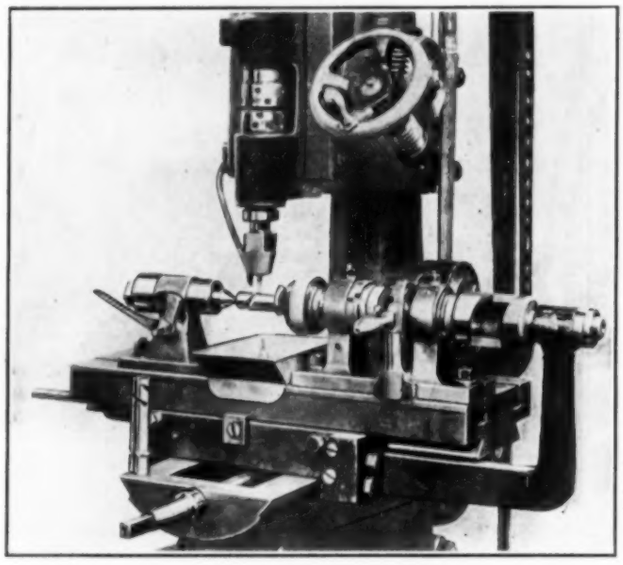


Fig. 1—Slot milling device on milling machine

vertical milling machine, while in Fig. 2 details of the construction are shown.

The feeding mechanism is supported by the head *A*, and a spring center by the tail stock *B*, which is adjustable for work of various lengths. A portion of the head *A* extends to the right and carries the worm-gear drive, an end view of which is shown in Fig. 3.

The milling machine table is shown at *D*, Fig. 2. In operation the table feed-screw is removed and the powerful spring *O* substituted to automatically return the table after completing the slot.

The work is rotated by the worm gear mechanism at

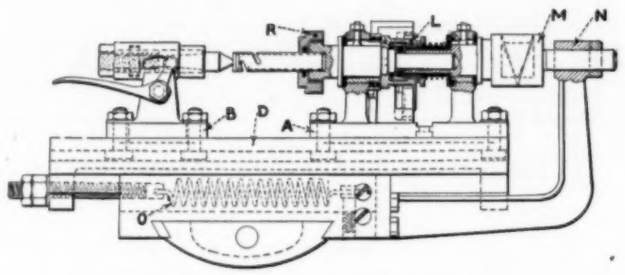


Fig. 2—Sectional view of the spindle

the back, as shown in Fig. 3, power being obtained from pulley *E*. Wormwheel *G* is driven by worm *F*, and the intermediate gear *H* is rotated by the link *I* from wormwheel *G*. The link can be adjusted in *H* for any desired position of the slot to be cut, while the stroke can be varied by moving the link connection in the slot across the wormwheel *G*. The proportions of wormwheel *G* and gear *H* are so arranged as to prevent the link from getting on a dead center. As the wormwheel *G* revolves continuously, it turns gear *H* through the desired arc and brings it back to the starting point, ready for the

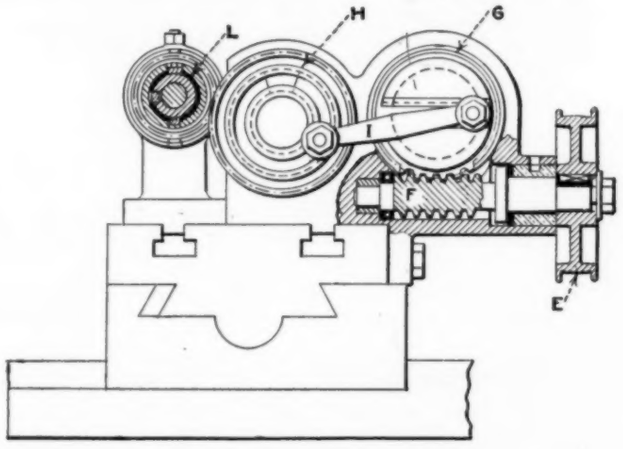


Fig. 3—The rotating mechanism

next cut. Gear *L* transmits the turning movement to the work-holding spindle.

The end movement of the work spindle is secured by

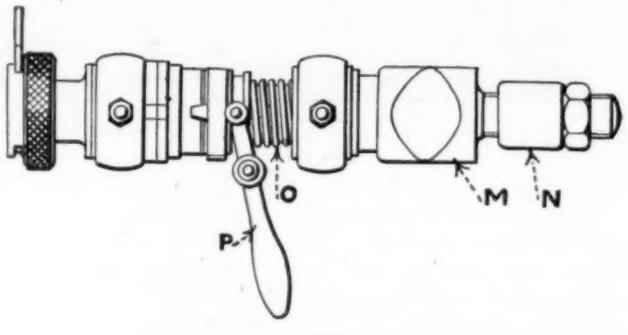


Fig. 4—Work spindle and clutch

means of two cams, one held stationary in the outer support *N*, the cams being shown both in the half-tone, Fig. 1, and at *M*, Fig. 2. As the work spindle is rotated by the gear *L*, the cams force the spindle to the left, and when the end of the cut has been reached, the work spindle reverses and, as the spring *O* holds the cam surfaces together, the work travels back in the path made by the cutter.

If the piece being milled is to have two or more slots, it is necessary to index it. To provide for indexing, the work spindle is divided, connection being made by a four-tooth clutch between the two parts. The clutch is operated by the lever *P*, Fig 4, so that it can be readily disengaged, and the front portion of the work spindle turned 90 or 180 deg., as desired. Spring *O* holds the clutch in position.

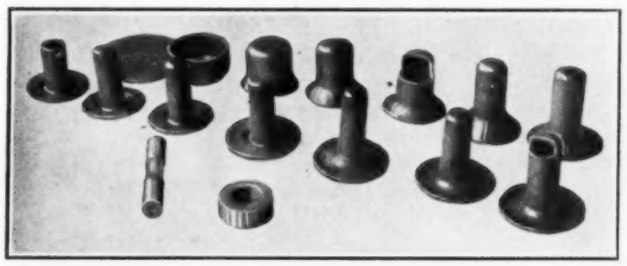
Work is held at one end in the chuck *R*, Fig. 2, the other end being supported by the spring center. The production is between 15 and 20 pieces per hour for pieces having two slots milled in them.

A Clutch Part Made by Cold Drawing

BY AMOS FERBER

The accompanying cut shows the successive operations upon a clutch part made by the Worcester Pressed Steel Co., Worcester, Mass. The material is cold drawing steel 0.18 in. thick, and the part starts from a blank that is 6⅜ in. in diameter. Each shell in the illustration, except the two that are sawed open at the top for the purpose of showing the thickness and condition of the metal, represents a step in the sequence of operations.

The first operation, performed in a double-action



The successive operations

press, is the blanking and cupping. The natural thickening of the metal that is bound to take place in any operation of transforming a flat blank to a cylinder of smaller diameter, and which usually adds to the difficulty of drawing a shell to a uniform thickness of wall because of the necessity of ironing out the metal as it flows into the die, is here used to advantage, as it is desirable to make the flange of the finished piece as thick as possible.

The drawing punch is therefore made somewhat smaller in diameter than would ordinarily be the case and the result is a slightly tapered shell with the wall gradually increasing in thickness toward the open end. This action is continued to some extent in the subsequent redrawing operations, with the result that the finished shell, though of uniform wall thickness throughout the cylindrical part, has a flange that is 0.22 in. thick, or 0.04 in. thicker than the metal of the original blank.

The following six operations are partial redrawings, performed in a long-stroke, single-action press, in which the shell is passed part way through the die and ejected before completion. The dies and punches used for these operations are so proportioned as to produce a uniform wall thickness and the flange, though no further reduction takes place in its diameter, is therefore gradually thickened toward the center as the cylindrical part of the shell is reduced so that, when completed, it is practically uniform in thickness.

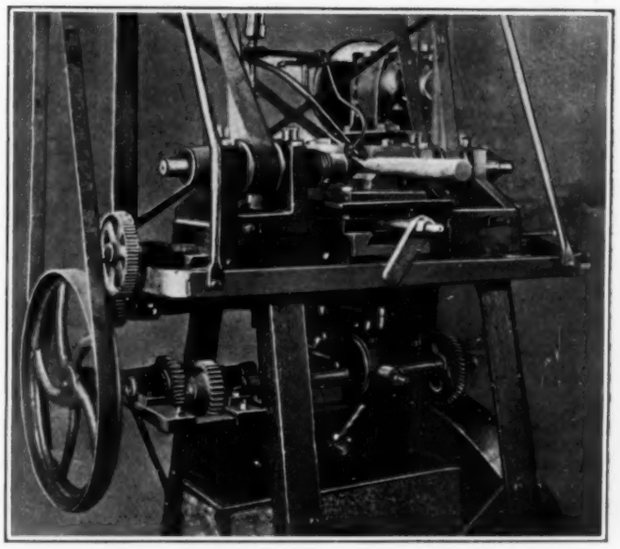
In the remaining four operations the recess around the cylindrical part is formed, the flange trimmed, the screw-holes pierced and the end of the shell cut off. That the entire job is of an exacting nature is shown by the fact that the through-hole must conform to a limit plug-gage of but 0.002 in. tolerance and a maximum-diameter ring-gage allowing a variation of only 0.002 in. must go over the cylinder.

Improvised Keyway Cutting Machine

BY DALE R. VAN HORN

The machine shown in the accompanying illustration was made for the purpose of cutting two keyways at once in opposite sides of a steel shaft. With the exception of the chucks, which were cast for the purpose, it was constructed entirely from angles, rods, straps, etc., combined with parts salvaged from discarded machinery.

The action is practically automatic, the chucks that



Keyway cutting machine made from salvaged parts

hold the cutting tools moving gradually closer together as the work proceeds, until the proper depth of cut is reached, while the heads are at the same time moved back and forth between predetermined limits by means of an eccentric, or cam, located underneath the table of the machine.

It may be noted that two of the gears used were taken from an old Ford engine while other parts were contributed from equally unrelated sources. The machine saves about twenty dollars in one eight-hour day, and as its has now been in service about a year it has long since repaid the cost of its construction.

Converting the Chucking Elements of Capstan Lathes from Push-Tube to Draw-bar

By F. Osgood Hickling
Nottingham, England

On page 772, Vol. 58, of the *American Machinist*, there is an article by A. W. Freeman outlining a method for converting the push action of a Warner & Swasey capstan lathe to a pull-rod, or draw-bar, movement in order to hold a gear blank while turning it. While this device displays considerable ingenuity, one is in doubt as to whether or not such a piece of mechanism will perform its functions efficiently, and also whether or not it will withstand the excessive wear and tear imposed upon this type of mechanism in every-day production work.

It is the writer's opinion, based upon years of experience, that the strains (and more particularly the overstrains) imposed upon moving and clamping parts of a

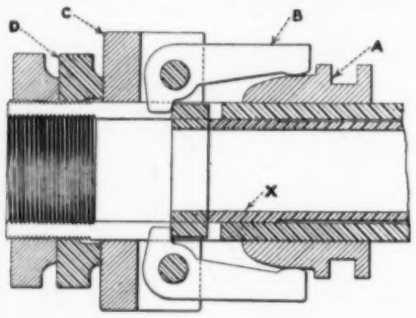


Fig. 1—Mechanism for operating push collet

fixture or chucking device of this kind are such as to debar the use of any but the simplest of mechanisms. Any tendency toward complication necessarily involves a number of small working parts; certainly less reliable than would be the case with a simpler device.

Having many times encountered the same kind of problem as the one above referred to, the writer of the present article sets forth the following method by which the same result may be attained, and would add that it has been highly successful over a number of years upon a great variety of work and under many conditions. While not in any way condemning the method adopted by Mr. Freeman, I would certainly recommend the following; believing that it will in every way prove to be more reliable and serviceable.

In order to make the comparison of the two layouts more easily understood, we will consider that the machine on which the conversion is to be made is a Warner & Swasey of the same type as that cited by Mr. Freeman. As a matter of fact the writer has actually carried out this conversion on quite a number of these very machines as well as upon many others, for, it will be obvious, it can be as easily applied to almost any capstan lathe having the toggle and spool type of chuck operation.

Fig. 1 shows a section of the rear end of a typical chuck-closing mechanism of the push type. The spool *A* is moved rearward along the machine spindle by the usual fork attached to a hand lever. This causes the toggle-arms *B* to ride up the cone of the spool, bringing the heel of the toggle into contact with the end of the push-tube, or a thrust washer which butts against the end of the push-tube, as shown. As the collar *C* rests against the nut *D*, which is screwed onto the spindle, and the toggle-arms are pivoted in the collar, the heel of the toggle forces the tube forward and thereby closes the chuck.

In Fig. 2 is shown a section similar to that shown in

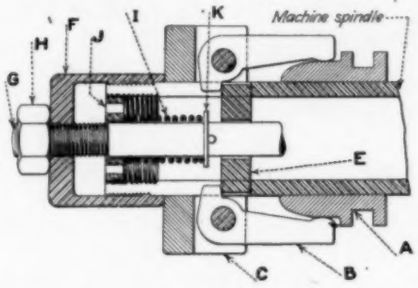


Fig. 2—Converted to operate a draw-rod

Fig. 1, but as it is when the conversion has been carried out. From this drawing it will be seen that the mechanism is both simple and efficient, while the great advantage lies in the fact that the reversal of the motion takes place at the rear end of the spindle (or, perhaps, it would be more correct to say that the motion is made to act in the required direction at the outset), so that having once effected this alteration the equipment can be utilized with any chucking device.

The new parts required to effect the conversion consist of a thrust block *E*, a cup *F*, the draw-rod *G*, the nut *H*, and the release spring *I* together with the spring thrust collar *J* and a washer *K*. The spool *A*, toggle-arm *B*, and the collar *C* are retained in the same form as already on the machine, but the thrust nut *D* and the push-tube *X* (see Fig. 1) are discarded.

Following the action of the new arrangement in Fig. 2, we note that the spool *A* is moved rearward as before, but as the toggle *B*, carrying the collar *C*, is now free to slide along the spindle and the heel of the toggle presses against the end of the slot in the spindle through the hardened thrust block *E*, the action forces

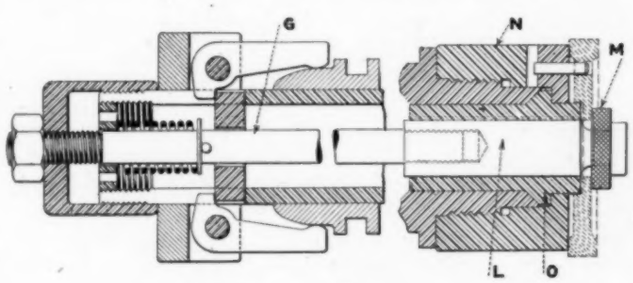


Fig. 3—As applied to Mr. Freeman's job

the collar *C* rearwards along the spindle, which in turn pushes the cup *F* rearward and imparts a pull to the rod *G*, which is connected to the chucking device at the front end of the spindle.

The coil spring *I* is to release the rod upon loosening the toggles, while the collar *J* takes the thrust and can be adjusted to give any desired spring pressure. On the machines where the spindle is not threaded on the inside, the collar can be held conveniently by one or two grub screws.

Fig. 3 shows the arrangement for performing the chucking operation outlined by Mr. Freeman on page 772. As the writer has previously stated, not only is the layout simpler and more efficient but, as regards wear and tear it is infinitely more satisfactory and its universal applicability is a distinct advantage.

The draw-rod *G* screws into a sliding bolt *L* which has a head small enough to clear the hole in the component. The U-washer *M* rests in the neck of *L* and clamps the component against the face of part *N*, which screws on the spindle nose of the machine. Part *N* not only forms a faceplate upon which to clamp and square up the work but it also clamps the locating bushing *O* into the hole in the spindle.

It will be seen that the method of holding the component is identical with that shown in Mr. Freeman's article.

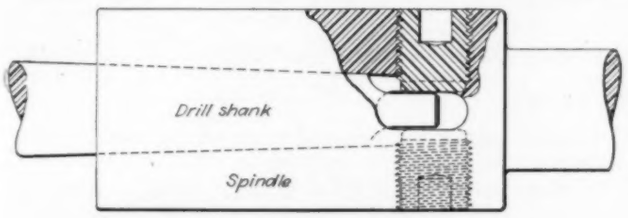
A small point, not often troubled about, is the knurling of the U-washer, and this is well worth doing as it greatly helps the operator.

Repairing Drill-Press Spindles

By A. W. Freeman

In our shop we have had occasion to make repairs to the spindles of several drill-presses, the shoulders of the drift-holes in which had become so badly worn that they could no longer be depended upon to drive drills and other tools of comparatively large diameters. The holes were in each case a No. 4 Morse taper. The sketch shows the way the repairs were made.

Holes 1 in. in diameter were drilled and tapped into



Repaired spindle for drill-press

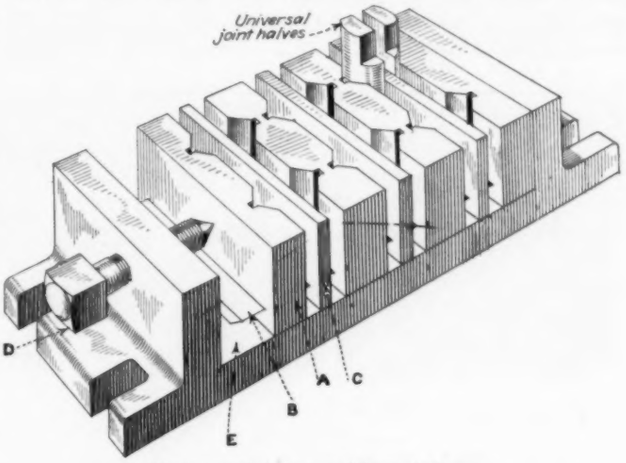
each side of the damaged spindles on a level with, and at a right angle to the drift-holes. Tool-steel plugs were fitted in these threaded holes, each plug having a small square hole in the outer end by means of which it could be turned in and out. When fitted, they were taken out and hardened, after which they were finally screwed in place. They were purposely made a very tight fit so that they would not work loose.

Milling Fixture for Universal Joints

By W. F. Sandmann

One of the operations in the machining of small universal joint parts is the milling of the jaw profiles. On account of the method of assembling the completed joint it is necessary to make jaws from half-round stock and keep the halves of each pair together throughout all operations. It was found that the halves could not be successfully clamped directly together, as they would not stay in position when the cutters entered, so the fixture shown in the accompanying sketch was made with a plate separating the jaw halves.

The V-blocks *A* slide on dovetailed ways as shown at *B* so that they are always in alignment. The plates *C* also slide on the ways and are knurled on both sides to more effectively resist the pulling-up tendency of the joint halves when the cutters enter. Six complete sets of joint jaws are contained in the fixture and



Universal-joint milling fixture

clamped in place by the screw *D*. The V-blocks and plates are allowed a few thousandths play so that any slight variations in the jaws will be taken up and the clamping be even. Sufficient space is left at *E* so that the V-blocks and plates can be started on the ways.

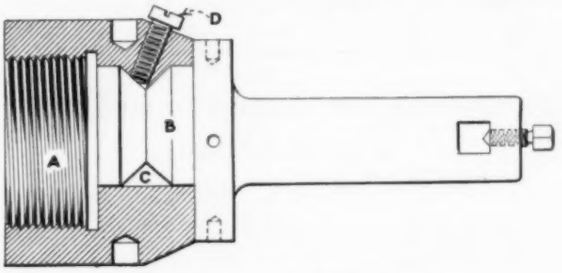
As the joint-jaw halves are backed so closely up to each other, the straddle mills are cutting air only a small fraction of the time.

Adjustable Boring Bar

By L. H. Garey

I have lately had several boring jobs to do in the milling machine where considerable stock had to be removed in enlarging cored holes.

Three cuts were required and as I had no adjustable boring tool, I made the one shown in the accompanying sketch. The body *A*, was bored and threaded to fit the



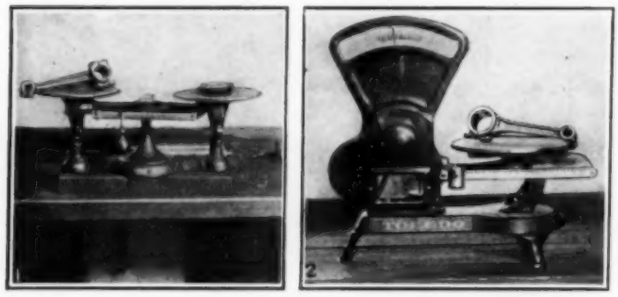
Adjustable boring bar

spindle nose, while the hole *B* was bored eccentrically in relation to the body. The boring bar was also turned eccentrically in relation to its shank, the amount of eccentricity in both cases being $\frac{1}{8}$ in. A groove *C*, was cut in the shank of the bar for holding it in place and against the shoulder at the bottom of the hole, by means of the setscrews *D*. Adjustment for size in boring is made by loosening setscrews *D* and revolving the bar with a spanner wrench, holes for the wrench being provided in the shoulder of the bar.

Modern Scale Saves Time in Weighing Connecting Rods

BY HAMILTON CASEY

A little study of the old-fashioned way of weighing connecting rods in an automobile shop, shown in Fig. 1, convinced the management that considerable time could be saved with better equipment. Consequently the scale



Figs. 1 and 2—Old and new scales for weighing connecting rods

shown in Fig. 2 was put on the job with eminently satisfactory results.

The special dial shown in Fig. 3 was laid out in the drafting room and substituted for the regular dial so

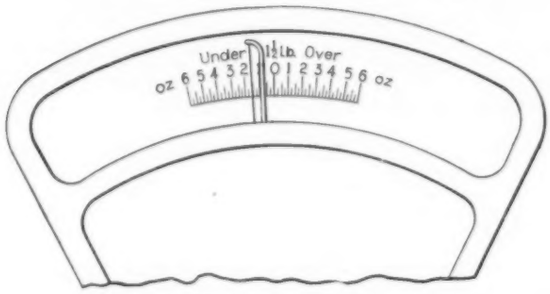


Fig. 3—Scale dial and pointer

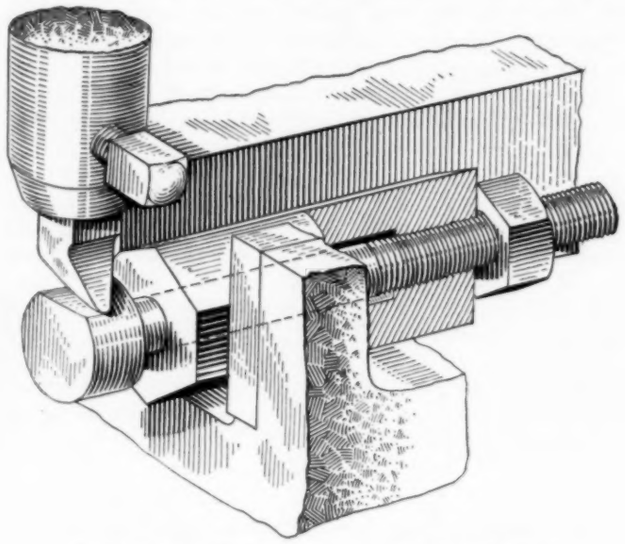
that the weigher can tell at a glance, to a quarter of an ounce, how much the rod being weighed is over or under the specified amount of one and a half pounds.

Fixture for Making Square or Hexagon Heads

BY JOE V. ROMIG

A simple little device to aid the toolmaker in making square or hexagon heads on special screws, when for some reason or other he cannot get a milling machine with a dividing head or has only one or two screws to make and it will hardly pay to set up the milling machine anyway, is shown in the accompanying sketch. This little fixture will go in a milling machine, shaper or planer—anywhere, in fact, that there is a vise—and it needs no setting up.

To make the fixture (it takes two if you want to make square heads as well as hexagons) take a short piece of hexagon cold-rolled stock; smooth it up; center it truly in the lathe chuck; and bore and chase-thread it to fit the screw. For square heads a piece of square stock must be obtained, but it is better to take off the corners in the milling machine and reduce it to octagon shape, for then you can make eight-cornered heads as



Making hexagon head screws in the shaper

well as four, and the tool will not take up so much room in your tool kit.

Once made and casehardened, the fixtures will last forever, and they are always ready for instant use. In a pinch, a very fair shaped head may be made by *filing;* with the device held in a bench vise in such position that the top of the vise jaws act as a filing guide.

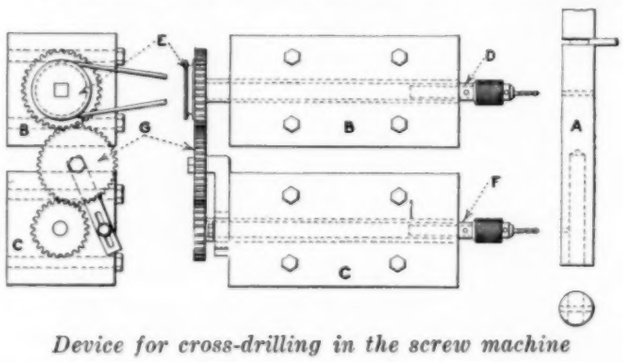
Cross-Drill Holder for Screw Machines

BY M. W. TAYLOR

Occasionally a job comes to the screw machine that requires the drilling of crossholes.

In the illustration, such a piece of work is shown at *A*. The drill spindles are held in bearings *B* and *C* which are adjustably mounted on the cross-slide of the machine. Spindle *D* is driven by a belt on the pulley *E*, while spindle *F* is driven through the gearing shown.

The intermediate gear *G* provides for running both



Device for cross-drilling in the screw machine

spindles in the same direction and, being adjustable for position and larger than either of the spindle gears, it allows the center distance between the spindles to be varied considerably. Where two holes of varying size are to be drilled, spindle gears of the proper ratio can be used.

News of the Week

James Hartness Elected President of F.A.E.S.

At a meeting of the Federated American Engineering Societies held in Washington, D. C., on Jan. 10, ex-Governor James Hartness of Vermont and a former president of the American Society of Mechanical Engineers, was elected president, to succeed Dean Cooley of the University of Michigan. At an all-day session on Wednesday, participated in by approximately one hundred organizations from all parts of the United States, the national public works conference held under the auspices of the Federated American Engineering Societies, adopted a resolution favoring a re-organization of federal departments. No particular plan was indorsed.

Mr. Hartness was born in Schenectady, N. Y., in 1861, but spent his early life in Cleveland, Ohio. Following his attendance at public schools, he commenced practical work in a machinery plant. Later he held the position of foreman in a manufacturing plant at Torrington, Conn. In the fall of 1888 he designed machinery for the Jones & Lamson Co., Springfield, Vt., and shortly afterward he took an active part in the management of this company. He served successively as superintendent, manager and then as president. In 1914 he was elected president of the American Society of Mechanical Engineers, of which he became a member in 1891. He is a fellow in the American Association for the Advancement of Science, a member of the Institution of Mechanical Engineers, the Verein Deutscher Ingenieure, the Astronomical and Astrophysical Society of America, the London Astronomical Society, the Royal Arts Society, the Vermont State Board of Education, the Boston Chamber of Commerce and several other associations. He was granted the honorary degree of M.E. by the University of Vermont and M.A. by Yale University. Mr. Hartness also holds a pilot's license for flying.

Secretary Hoover Speaks

At the suggestion of Calvert Townley, a past-president of the American Institute of Electrical Engineers, the federation went on record as favoring an engineering investigation of the St. Lawrence-Great Lakes waterway before the matter was definitely presented to the American and Canadian governments. The chief speaker at Wednesday's meeting was Secretary Hoover of the Department of Commerce, and the first president of the engineering federation. Mr. Hoover said that no isolated bills for government re-organization could pass Congress and that the problem of regrouping public works

James Hartness

functions was inseparably tied up with the larger problem of reorganization.

Segregation of vast public works functions, in his opinion, must be accompanied by parallel segregation of other activities. He also asserted that the creation of a new public works department with a secretary as a member of the president's cabinet was out of the question. Executive Secretary L. W. Wallace of the Federation said that Secretary Work of the Department of the Interior, was in sympathy with the movement to make over the latter department by the creation of a division of public works and a department of public domain.

Society's New Name

The American Engineering Council on Jan. 11 formally adopted a resolution approved earlier in the week by the Public Works conference favoring the reorganization of the federal departments, particularly in reference to the grouping of public work functions in a re-named existing department. This action presages a renewed drive on the part of the Council to unify the activities.

Constitutional changes were effected whereby the name "American Engineering Council" will supplant that of "Federated American Engineering Societies." What has been the Council becomes "The Assembly" while the executive board, in the future, is to be known as the administrative board.

Four-Wheel Brakes and Balloon Tires Featured at Auto Show

Closed car models continue to gain in popularity

Although held in the Bronx, far from the hotel center of the city, the New York Automobile Show this year attracted the usual large crowds.

The 258th Field Artillery Armory is an ideal exhibition floor because not a single column interferes with the arrangement of the exhibits or line of vision. As the show was arranged the cars were placed in the center of the room with the accessories arranged along the four walls and in the balcony. Exhibits of accessories were numerous and along with them were shown quite a number of garage and service station machines, such as regrinding, hoisting and balancing machines, and air compressors.

The outstanding attractions at the show were the four-wheel brakes and balloon tires. There was a noticeable gain in the number of closed cars exhibited, although the open models have not by any means been discarded. They still are popular and probably will remain so with people who can afford two or more cars. Four-wheel brakes have been adopted by a number of concerns as standard equipment. With others they are made optional. The hydraulic brake seemed to take the fancy of many, as would be expected, on account of its simplicity. In addition to having as working parts only the master plunger and the plungers on the brakes, it does away with a great deal of mechanism and leaves a clean-looking chassis.

Balloon tires are optional with many makers and promise to be greatly favored by purchasers of cars during 1924. Owners apparently appreciate the opportunities given by balloon tires for easier riding and for prolonging the life of the car.

In addition to the major features noted there have been some changes in the chassis, although for the most part the power plants and other mechanisms remain practically the same.

Niles-Bement-Pond Will Hold Annual Meeting

At the coming annual meeting of the Niles-Bement-Pond Co., including the Pratt and Whitney Co., to be held on Feb. 6, it is understood that several important changes will be made in the board of directors. From interests close to the company it has been learned that recent rumors of a fight for control are baseless, and that whatever differences may have existed between the management and certain stockholders have been adjusted harmoniously.

Motor Transports for Freight Favored by Transportation Conference

Industrialists urge supplementary measure for railroads

Representatives of the three branches of transportation railways, highways and waterways—and of important commercial, industrial and agricultural interests, participated in the shaping of a proposed national policy of transportation and practical measures for putting it into effect at the National Transportation Conference held at Washington under the auspices of the Chamber of Commerce of the United States, on Jan. 9, 10 and 11.

It has been estimated that the railroads alone will require during the next ten years $7,870,000,000 to provide additional facilities needed as a result of the normal increase in traffic. Huge sums will be needed for highway building and the development of waterways and water transport. The financing of these requirements were considered by the conference together with measures for linking together rail, water and highway transport in order that adequate and economical transportation may be provided to meet the needs of expanding commerce.

The announcement that store door freight service would be put into service in several cities in the United States within the year was made by A. H. Swayne, of New York, vice-president of the General Motors Corp., speaking before the second day's session.

Mr. Swayne is chairman of the committee on motor transport of the conference. His report on the use of the motor truck as an auxiliary to the railroads provoked a discussion as to whether store door collect and deliver freight service, as a means of relieving railroad terminal congestion, should be instituted by the railroads themselves or by other interests. Mr. Swayne declared that members of his committee, in co-operation with the Department of Commerce, already had under way plans for experimental services.

Saving Explained

Mr. Swayne also declared that enormous amounts can be saved out of present appropriations for the purchase and improvement of expensive real estate by the railroads if motor transport is used for the distribution of freight within crowded terminal areas.

The progress already made by the Pennsylvania System in supplementing railroad service by the establishment of motor transport lines was explained by Robert C. Wright, general traffic manager of the Pennsylvania System. The experiment was first made with short haul traffic, he said, and it was found possible and practicable to abandon a number of trains used in hauling suburban freight by turning the traffic over to motor trucks maintaining a regular service.

The Pennsylvania System, Mr. Wright continued, is now making a study of the use of the motor truck for the transfer of freight within the terminal area and for door-to-door delivery. Plans to this end will shortly be put into effect to determine the feasibility of projects of this kind. Mr. Wright expressed the belief that the Pennsylvania System, by using motor trucks for the distribution of freight from more than twenty terminals in the city of Philadelphia could release for line service 500 cars used daily for this purpose.

The successful adoption of motor transport to supplement the railroads in the Eastern Shore district of Maryland was explained in detail by A. E. Beck, general traffic manager of the Baltimore Merchants' and Manufacturers' Association.

Joseph X. Galvin, president of the National Team and Motor Truck Owners' Association, made an appeal for the careful regulation of the common carrier operations of motor transport in order that it may be placed on a more dependable basis.

"The formulation of long view national policies in transportation that will secure for us economical and adequate handling of goods is the first fundamental to our whole economic future," stated Herbert Hoover, Commerce Secretary. "The solution of the problems in such policies is only in part a matter of legislation and governmental relations. They are in large part to be solved by initiative and voluntary co-operation amongst the businesss community. It marks a great step in our business progress when all the elements such as are represented in the sub-committees may come together and agree on solutions in important questions, and outline a method of co-operation by which they are to be atttained."

Resolutions adopted endorsed the Transportation Act of 1920, with slight opposition from representatives of the National Industrial Traffic League, declared that "railroad rates in the United States are not, as a whole, unreasonably high," and should be revised only after painstaking investigation and expressed firm opposition to the repeal of Section 15A of the Transportation Act.

The conference also opposed any change in the method of valuation of railroad properties, approved of supervision by the Interstate Commerce Commission of intrastate as well as interstate rates and advocated voluntary consolidation of the railroad systems. Action looking to a realignment of the activities of the Railroad Labor Board was recommended but not such as would disband the present board.

"No Saturation Point" Says Schwab at Automobile Dinner

Cost of distribution must be lowered, is his belief

Charles M. Schwab, in an address at the dinner of the National Automobile Chamber of Commerce at the Hotel Commodore, New York, declared that the automobile industry today was in the position that the steel industry found itself in at the beginning of the present century.

"We are told that the automobile is reaching the saturation point, but in a growing country like ours there can be no such thing as a saturation point," he declared. "Furthermore, the whole world is before us, and the possibilities in the direction of producing motor cars for the use of the people of the world is simply beyond limit.

"The use of the motor car is permanent and must be ever onward and increasing. In the steel business we thought in 1900 when we were producing around 17,000,000 tons of steel per annum that we had reached the zenith of the business, and yet last year we produced 40,000,000 tons of steel, against a capacity of 50,000,000.

"Such is my own confidence in the future of the steel business that the Bethlehem Steel Corp., with which I am identified, is increasing its plants and developing its facilities with a view to increasing its output and improving it ability to produce steel with ever greater economy. We are just as far from the zenith of the steel business as ever.

"The most striking fact that producers of automobiles must face today is that, in spite of the low level of manufacturing costs, 40 per cent of the shop cost has to be added to the cost of the car to put it into the hands of the consumer. This abnormally high cost of distribution presents today the same challenge to the ingenuity of the automobile maker as was presented in the problem of manufacturing fifteen years ago.

"The chief problem of the automobile industry today is to reduce this cost of getting the car from the factory to the ultimate consumer. The price of motor cars can be made much cheaper to the consumer without anything but increased profit to the manufacturer through the added volume of sales if these excessive costs of distribution are reduced."

Edward J. Cattell of the Philadelphia Chamber of Commerce also spoke. The dinner was attended by 1,000 automobile executives and their guests.

The annual decorations for meritorious service were awarded to the following: A. P. Sloan, Jr., president General Motors Corp.; F. J. Haynes, president Dodge Brothers; Walter P. Chrysler, president Maxwell Motor Corp.; Roy D. Chapin, chairman Hudson Motor Car Co., and Edward V. Rickenbacker, vice-president Rickenbacker Motor Co.

Big Rail Merger Is Contemplated

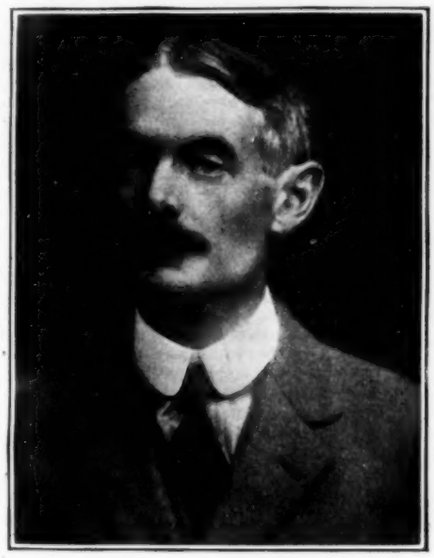
Consolidation of the Nickel Plate and the Chesapeake & Ohio railroads will be the first step in the construction of the new 13,000-mile Van Sweringen railroad system to compete with the New York Central, the Pennsylvania and the Baltimore & Ohio, it was learned recently. Such a system, according to a statement made by W. A. Colston, vice-president of the Nickel Plate, to the Interstate Commerce Commission, would include the Erie and the Virginian, thereby connecting the present system with Eastern seaports.

H. M. Crane Elected President of S.A.E.

H. M. Crane, technical assistant to A. P. Sloan, Jr., president of the General Motors Corp., was chosen president of the Society of Automotive Engineers at a dinner in Hotel Astor, New York, Thursday, Jan. 10. Although the annual session of the Society will be held in Detroit this year during the Detroit Automobile Show, it was found necessary because of a technicality to hold the election in New York.

Mr. Crane has been prominent in the work of the society, particularly along the lines of fuel and research work.

The following other officers were



H. M. Crane

chosen: E. A. Johnston, first vice-president; W. R. Strickland, second vice-president (motor car engineering); J. F. Max Patitz, second vice-president (tractor engineering); H. L. Pope, second vice-president (aviation engineering); T. B. Fordham, second vice-president (stationary internal-combustion engineering); W. C. Ware, second vice-president (marine engineering); C. B. Whittelsey, treasurer. W. A. Chryst, F. W. Gurney, A. J. Scaife, J. H. Hunt, A. K. Brumbaugh and M. P. Rumney were selected councilors.

Dr. M. L. Burton, president of the University of Michigan, gave a brilliant talk on "That Mind of Yours." In the course of his remarks he defined the conservative and the radical mind, pointing out that the weakness of the conservative mind lies in the fact that it often confuses truth with age, forgetting that truth is consistency and knows no age. The radical fails to benefit by the experiences of mankind and throws into the discard many immutable facts of life and human nature, he pointed out.

"The mind is primary in civilization," he declared. "There are various types of minds, the receptive mind and the independent mind, and how the mind is used is the determining fact in personal advancement, provided it is hooked up with sane, clean living, as each human body functions as a unit.

"The thinking mind is the ideal type of mind. The trouble is we think too little—because thinking is the hardest work imaginable. Education cannot be poured into young minds. Education is nothing more than setting the mind in motion. It is a question of 'root, hog, root.'

"All about us are young boys and girls who will do things we never thought of or dreamed of. We must stand by in sympathy while they try new things—while they go ahead. We must believe in research.

"It is not possible to get the kind of mind you want unless you work for it and develop it. No one ever developed a great mind by linking it with unclean morals. Brains and character make for success."

E. S. Jordan presided as toastmaster. He was introduced by H. W. Alden, the retiring president of the society. Bugs Baer enlivened the meeting by his shafts of wit at the industry.

New York Welders Meet at Air Reduction Sales Co.

About sixty-five members of the New York Section of the American Welding Society journeyed to Jersey City, N. J., on the evening of Jan. 8 and held a meeting at the plant of the Air Reduction Sales Co. F. E. Rogers explained the operation of the welding and cutting machines built by the company and actual jobs were then performed on the Oxygraph, Radiograph, Camograph, Pyrograph, Duograph and Tube Welding machines. At the conclusion of the demonstration questions were answered by Mr. Anderson. A talk on recent developments in the field of Thermit welding, illustrated by slides, was given by W. R. Hulbert of the Metal & Thermit Corp. One interesting job described was the repair of roll necks. Instead of casting the whole neck of Thermit steel only about 50 lb. are used to melt the end of the roll. Then open hearth steel is poured on top of the Thermit steel to form the new neck. Considerable savings result.

Announce Program for A.S.S.T. Meeting

Arrangements for the fifth sectional meeting of the American Society for Steel Treating to be held at the Hotel Seneca, Rochester, N. Y., Jan. 31 and Feb. 1, have been completed and a most interesting program has been mailed to the members. A. H. d'Arcambal, chief metallurgist for the Pratt & Whitney Co., Hartford, Conn., will speak on the subject, "Some Carbon and High Speed Steels Used in the Manufacture of Small Tools"; Prof. H. M. Boylston, head of the Department of Metallurgy, Case School of Applied Science, Cleveland, will speak on, "Control of Production by Scientific Methods"; J. V. Emmons, chief metallurgist for the Cleveland Twist Drill Co., Cleveland, Ohio, will speak on, "Treatment of Tool Steel"; Dr. Ancel St. John of the research laboratory, Union Carbide & Carbon Co., Long Island City, will speak on, "The X-Ray and Steel," and O. W. Ellis, assistant professor of Metallurgy, University of Toronto, Toronto, Can., will speak on, "Structure of Metals."

At the banquet to be held on the first night of the meeting, Dr. Rush Rhees, president of the University of Rochester, will act as toastmaster and Dr. George K. Burgess, president of the A.S.S.T., will be the chief speaker. Four plants will be visited by the delegation. The Gleason Works, the Taylor Instrument Co., the Bausch & Lomb Optical Co., and the research laboratory of the Eastman Kodak Co. have been chosen for the tours.

Buick Plans Many Expansions

In order to bring its production capacity to 1,200 cars a day, the Buick Motor Co. will expend $11,000,000 in new buildings, additions and equipment for its main plant at Flint, Mich., and its subsidiary plant at Detroit.

The above news was authorized recently by H. H. Bassett, president of the company, who was in New York for the Automobile Show. Mr. Bassett said:

"Although we built more than 200,000 automobiles during the calendar year of 1923, we found that record-breaking number insufficient to supply the demand for Buick cars. That demand continues, and to meet it we are considerably extending our facilities."

Already nearing completion is a stock storage building 1,064x63 ft., also 41,000 sq.ft. added to the gray iron foundry, 8,000 ft. to the forge shops, and increased lumber drying facilities for the body shop.

Additions authorized for completion prior to June 1, 1924, include the following: 210x360-ft. addition to motor plant; 55x120-ft. addition to the heat treat plant; 50x120-ft. addition to the motor test building; 125,000 sq.ft. added to sheet metal plant; 140x200-ft. addition to completed car warehouse; 80x240 ft. added to tool-making shop.

American Machinery for Japanese Company

A building construction company is now being projected in Tokyo for the purpose of undertaking "to do civil engineering, construction work and to give loans to building contractors for construction expenses and also to import materials from foreign countries to supply the demand," according to a tentative prospectus received by the Far Eastern Division of the Bureau of Foreign and Domestic Commerce from its representative at Tokyo.

This new company is said to include that previously projected and sponsored by the Tokyo Chamber of Commerce which was to specialize in the construction of industrial and commercial buildings.

The new corporation will be known as the "Nichi-Bei Doboku Kabushiki Kaisha" or "Japanese American Engineers' and Contractors' Corp." and will be financed and controlled jointly by Americans and Japanese. Head offices will be established in Tokyo with branches in other parts of Japan as may be deemed necessary.

Technical skill, machinery, and building materials needed in carrying out the plans of the corporation are to be secured in the United States.

Machinery Business in Canada Shows Steady Conservative Gains

Railroads contemplating expansions and improvements

Throughout Canada, activity in the machinery and metal working industries is well sustained and the dominant opinion is that conditions will steadily improve. No boom is looked for, but leaders in the industry in every part of the Dominion feel that the prospects for the year are reasonably good. The various railway equipment firms such as Canadian Locomotive Co., Canadian Car & Foundry Co., etc., look for continued activity throughout the year. The Canadian Pacific Railway has decided to proceed with the construction of 300 freight cars, and specifications for the material required are now under consideration. Hon. George P. Graham, federal minister of railways, has announced he will shortly confer with the Canadian National Railway board in respect to the question of the construction of branch lines in various parts of Canada. He fully expects that in view of the demand for branch lines, particularly in the West, legislation will be brought down at the forthcoming session of parliament.

The car companies are estimating on a number of jobs, and if they are successful in securing only half of the contracts they are figuring on, it will provide capacity work for the various shops for at least half the coming year.

The volume of trade continues to expand, with the balance in Canada's favor. The increase in the imports for the twelve months ended with November was $143,000,000, while the betterment in exports was $156,000.000. The largest increase in trade was with the United States, imports increasing by $113,000,000 and exports by $87,000,000. One of the most important items in Canada's export trade during the twelve months was automobiles. In all, she shipped 67,365 passenger cars and 11,136 trucks. The increase in the production of automobiles is steadily continuing, while at the same time a larger proportion of domestic sales are being made from Canadian plants.

Quietness which prevailed in most of the larger industrial centers during the holidays has given place to much activity. The metalworking plants of both Montreal and Toronto report sufficient orders on hand to provide work for the winter months. The lumber mills of British Columbia are speeding up, and the continued heavy demand for newsprint both for export and domestic use is keeping the mills of Ontario, Quebec and the Maritime provinces busy. The machine tool industry will benefit considerably by the many improvements and extensions that are to be made this spring and summer by pulp and paper companies. The prospects for the coming year in this industry are encouraging and a steady activity is anticipated in most lines.

While the winter weather has now set in with real earnestness in all parts of Canada, the exceptionally mild spell which prevailed right up until Christmas day allowed building operations to continue later than usual, with a consequent good demand for materials. Employment continues fairly satisfactory. The index number of employment on Dec. 1 was 95.7 as compared with 95.1 on Dec. 1, 1922.

British-made machinery is gaining a strong footing in the Western provinces. Intensive efforts on the part of British manufacturers is greatly increasing sales, which amount to approximately $3,000,000 a month.

Milwaukee Business Is Developing

Inquiries portend better business in coming weeks

New business in metalworking machinery is developing in a most encouraging manner. Since the beginning of the new year, bookings have not assumed any degree of volume, but inquiry has been moderately active. This set in immediately upon the resumption of business after Jan. 1, while in former years a week to ten days elapsed before prospective buyers put forth requests for quotations and delivery dates. This in itself is considered a good sign.

The automobile industry again looms as the major factor in machine tool trade, inquiry from and sales to this source so far in the new year leading all other classes of the machinery business. Present activity revolves more or less about production machinery. During the latter part of the old year purchases were principally of toolroom equipment. Hardly as much is expected of the automobile trade in the way of machinery purchases this year as last, it being figured by many that the generous enlargement of productive capacity during the record-breaking output year of 1923 probably will suffice to meet the major share of demands in 1924. However, the demand for replacement alone, together with the constant call for tools of advanced design to promote efficiency and economy is expected to develop a very healthy aggregate of sales in the current year.

Railroads have done little so far in closing on inquiries put out late in the old year, but the expectancy is for a revival in sales to these interests. Just now railroad repair shops in this territory are operating with reduced forces, which is a customary matter of the season. It is providing opportunity for a survey of equipment needs, both for replacement and new capacity, and doubtless buying will be somewhat more lively as soon as the needs are determined. There seems to be no reason to expect that railroads in this region will buy more than absolute and imperative needs dictate, owing to the stringency of capital.

It is expected that within two or three months the Milwaukee Sewerage Commission will be ready to take figures on a round lot of general machine shop equipment for the machine and service shops being erected in connection with the huge sewage disposal plant on Jones Island, Milwaukee. It is unofficially estimated that the total investment will run up to $175,000 or $200,000. Specifications are being prepared but details will not be made public until the Commission is ready to place the entire list before the trade.

Manufacturers of electrical appliances of all descriptions are expected to be good buyers of shop equipment during the year. In fact, these interests have been doing some buying through the holiday season and are making inquiry in an increasingly active way. Manufacturers of radio instruments and parts are besieged with new orders due to the tremendous sale of such merchandise in the last holiday season, and it would appear that existing facilities are far too limited to take care of present demands and the very substantial call that is still in the foreground.

Buying in Buffalo Increases

The confidence expressed in December by machinery dealers of the Buffalo district seems to have been born out by the business since that time and at the present time the dealers are inclined to view the future in a more optimistic spirit.

Orders are actually materializing and, while the business booked comes mostly in small orders, single machines usually, the volume is getting bigger all the time and the buyers are no longer holding off as they were a few weeks ago. Inquiries are still arriving in a most lively fashion and the time has come when a large part of the business for which inquiry was made in December will be definitely placed.

Perhaps the most dominating subject of interest in the Buffalo machinery trade right now is the proposed new model which everyone believes the Pierce Arrow Co. will place on the market during the year. The company has taken over part of the old Curtiss Airplane plant in this city and this will probably be equipped for the manufacture of the new car.

Machinery Needed

While there has been considerable discussion of the type of equipment that might be needed for such a plant no definite specifications have been sent out. However, machinery men that understand the situation believe that the order, when placed, will run close to $500,000. It probably will be the largest single order placed in Buffalo in several years.

Reports from various sellers of machinery vary as to the volume of the business, but all report a fairly good business with the exception of those who handle road machinery mostly. The offices report that this improvement has been noticed in almost all lines of equipment and that inquiries come from both large and small buyers for spring delivery.

December closed up as a good month for most of the firms in town. Most of the business was done in the latter part of the month.

Chicago District is Quiet

The machinery market in the Chicago district still reflects the holiday condition. No new inquiries of any consequence were received either from the railroads or industrials.

Machine tool dealers believe that the outlook for 1924 is brighter because a majority of the used machine tools placed on the market after the war have been disposed of and will not interfere with sales of new equipment. There have been many developments and changes in the more aggressive machine tool manufacturers' products in the last three years in this district. Users of machinery who continue to use old or second hand equipment will doubtless decide during the current year that they cannot afford to continue the use of obsolete machinery. Appropriations of many of the larger users of machine tools, which have been held up for the past two years in Chicago will be released this year. Many shops are realizing the necessity of more productive machine tools in order to meet the competiton which they expect. It seems to be the general opinion that competition this year will be unusually severe because economists do not predict any increase in the total buying power of the country, if anything a slight decrease and the manufacturer who increases his sales over last year will do so at the expense of his competitor. The hopeful outlook is somewhat marred by the fact that we are entering a presidential year and business is always uncertain until that is finished.

Several punches were disposed from the floor by local dealers to industrials during the week. The New York, Chicago & St. Louis R.R. has placed an order with the Whiting Corp. for a five-ton overhead electric jib crane. The Yazoo & Mississippi Valley R.R. has ordered a fifteen-ton pillar crane from the Whiting Corp.

Inquiries Plentiful in New York

Business in the machinery and machine tool lines in New York City remained practically unchanged with the tone encouraging and with inquiries coming in larger volume than at any previous time on record since the war. Salesmen for all dealers and builders are hard at work and reports show that sales are in the formulative state with promises of consummation in the very near future. But, neverthless, the complaint remains that actual sales are not being recorded with the frequency that was hoped would be the case following the first of the year.

The attention of the machine tool builders was centered upon the automobile show that was held in New York last week and reports are to the effect that machine tools and woodworking machinery will be needed during the coming year to almost as large an extent as during 1924. The Ford Motor Co. are again in the market with good sized lists and other makers are sending out inquiries for tools with which to fashion their latest models.

Railroad buying is not as spirited as it was during the last part of 1923, with only a few lists out. The New York Central R.R. has a list out for a few tools and other roads in the East are buying necessities with promises for bigger purchases within the near future.

Dealers in used machinery state that business has kept up better than they had anticipated and that it looks as if a good year was ahead of them.

Exporting is going along steadily, with gains reported by some of the exporters.

Plants Active in Indianapolis

In spite of seasonal conditions, there is an under-current of strength in the machinery trade that is encouraging in Indianapolis. Right at the present time the machinery men here have just completed their inventories and the men to whom they sell are completing theirs, so that another fortnight should see the beginning of real business for 1924. In glancing back over the past year, the trade here can find nothing so very wrong with the volume of business done. The year was better than the year before and the general impression here is that it was but the beginning of an era of general prosperity that likely will extend over a period of years.

Just at present the biggest thing of interest is the probable attitude of Congress on the Mellen tax plan for reduction.

Most of the officials connected with the automobile industry here are in New York attending the show, and from reports being received it seems there will be a good business beginning early in the spring. The fall business held on a long time after it usually closes. The overwhelming preponderence of the closed body job over the open car in popularity, is welcomed by the officials of local body plants.

Furniture factory executives here are preparing for the mid-winter shows in Grand Rapids and Chicago and it is not expected there will be any large amount of buying on their part until they are able to more nearly gage next year's business. Many replacements, however, are contemplated if business looks at all active.

There continues to be a big demand here for woodworking machinery, according to Fred C. Gardner, treasurer of the E. C. Atkins Co. Mills both in the South and on the West coast are short on stocks, he says, with the result that they are installing more machinery in order to be prepared for the spring rush of business.

"SUCH AN ABUNDANCE OF PROGRESSIVISM WE CAN'T BUDGE"

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J. M. Ding in the New York Tribune

The Business Barometer

This week's outlook in Commerce, Finance, Agriculture and Industry based on current developments

By Theodore H. Price
Editor, *Commerce and Finance*, New York

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IT IS DOUBTFUL whether those who are living when epochal changes are in the making appreciate the importance of the drama in which destiny has assigned them a part. This was true of what Gibbon called the decline and fall of the Roman Empire. It was also true of Cromwell's time.

In England it is today conceded that the Labor Party will shortly be in charge of the British Government and Ramsay Macdonald, who is the leader of that party, has announced that "the pompous folly of standing aloof from the Russian Government will soon be ended."

The momentous significance of the impending change and the announcement quoted does not seem to be appreciated in Europe or America.

Among those who cling to the idea that government is an inalienable prerogative of the "intelligentsia" there is a confident hope that the supremacy of labor and ascendancy of what is called anti-capitalism will be a passing phase; that the labor ministry will soon fall of its own weight and inefficiency and that the world will revert to pre-war conditions in a year or two. This may be, but it is doubtful, and much of the liquid capital of Europe is meantime seeking sanctuary in the United States.

This transfer has been accomplished by converting sterling and francs into dollars. The result has been a continued decline in the New York price of foreign exchange. Last Thursday sterling sold at $4.27⅛ and franc cheques on Paris at 4.83¼ cents.

This is the lowest price ever touched for francs, but the movement is more important than the figures indicate and may have a profound effect upon the world's business. The French Government has endeavored to stop it by sumptuary control of the foreign exchange market and the expulsion of a Dutch money broker said to be operating on the bear side, but these expedients will prove futile unless confidence in the stability of European finance can be revived.

Even if this be possible it will take time and this country is meanwhile confronted with a further and probably great increase in its supply of credit and ultimately in the supply of gold.

Concurrently the purchasing power and the lending power of Europe will be further reduced and in an economic sense America and the Western Hemisphere will become more self-contained.

Last week the market seemed to show a subconscious appreciation of these basic facts. Commerce, by which is meant the purchase and sale of commodities, seems to be slowing down and the credit released as well as the money imported is finding employment in the security markets. Stocks and bonds are therefore higher and seem likely to advance further while consumable articles used for food, raiment and construction are less active.

These opposing movements are logical and they seem likely to persist. Most corporations made money last year and their past prosperity is now finding recognition. The low priced railway stocks have been particularly strong. The Supreme Court has affirmed the constitutionality of the "recapture clause" in the Railroad Act which provides that the roads which earn more than 6 per cent on their value shall divide the excess with the Government. As the fund so accumulated is to be used to help the weaker properties in case of need a sentimental presumption in their favor has been created by the decision.

The bond market has also been firmer. There has been good buying of "Liberties" and the hope of lower surtaxes has increased the demand for good taxables. Most good judges continue to expect higher prices for prime investments and the strength of first class securities is gradually extending itself to those of a lower grade, that are on the market.

The statement of the Federal Reserve Banks issued last Friday confirms this analysis of the trend of business in a startling manner. The fluctuations of the important items were the widest in many months. Earning assets decreased $245,000,000 to $1,026,000,000. As this figure must be kept up to about $900,000,000 merely to pay the expense of running the system, which is around 35 millions a year, it is obvious that if the decline continues steps must be taken to put more money to work. Either heavy purchases of securities in the open market must be made or rediscount rates must be lowered. The former course is more likely to be followed, and its effect will naturally be to advance security prices without directly or immediately stimulating commerce.

At the same time a plethora of money for commercial needs is assured and the saving support of low interest rates underlies the business structure to prevent any collapse.

The Federal Reserve statement concurrently showed an increase of $47,000,000 in gold, a decline of nearly $100,000,000 in note circulation and an advance in the reserve ratio from 73.8 to 78.4 per cent, which is its widest and most important move in the past two years.

For the first time in nearly two years the note circulation of the German Reichsbank has shown a decrease. There were outstanding on Dec. 7, 390 billion billions. At the current quotation of about 25 cents a trillion they were worth less than $100,000,000. The gold reserve held against them was about $20,000,000 greater. In the relation of these figures the possibility of manipulation is apparent. It is perhaps a fantastical suggestion, and is put forth only in that light, but it would be quite possible for the industrialists who control Germany, and who have enriched themselves through the depreciation of the mark, to put it up temporarily to perhaps three or four times its present price and thereby enrich themselves still further. It is at least an interesting and not altogether improbable possibility.

What's Doing in Industry

Many inquiries but few actual sales are the reports received from all districts in the machinery and machine tool field since the first of the year. Indications are that business—when the orders actually start—will be extremely good in these lines and builders are preparing for excellent business this spring. Woodworking machinery is in demand as well as machinery used in construction work and mining.

In the electrical field business has been quiet following one of the greatest holiday trades ever experienced. Motors are finding a good market everywhere but in the East.

Street railways are making appropriations for the coming year and in all sections these amounts are larger than they have been for some years previous. Bus manufacturers report an unprecedented demand for this means of transportation and bus making will be rushed during the year.

Indications point to railroad consolidations as well as automobile consolidations, but nothing of a definite nature except the Von Sweringen interests has been announced.

Business Items

The Dale Machinery Co., machine tools, has opened an office in New York City at 50 Church St. The personnel of the company is similar to that of the Dale company before its merger in the Consolidated Machine Tool Corp. of America.

The Western Iron Stores Co., Milwaukee, Wis., John A. Camm, president and general manager, has been appointed the representative for the R. K. Le Blond Machine Tool Co., Cincinnati, Ohio, in the Wisconsin district.

The W. W. Sly Manufacturing Co., Cleveland, Ohio, has appointed the P. H. McArdle Equipment Co., New Orleans, La., representative for Louisiana, Mississippi, Texas and Florida.

The Shurly-Deitrich Co., Ltd., of Galt, Ontario, is celebrating its golden jubilee in the business of making saws.

Production has started in the new $10,000,000 factory addition of the Ford Motor Co. of Canada, Ltd. The first car off the temporarily constructed line was a new type of coupe.

Obituaries

WILLIAM HOOPES, chief engineer of the Aluminum Co. of America, died in Pittsburgh on Jan. 9. He was fifty-seven years old, and had been with the company since 1900. The rapid development of the aluminum industry, particularly for electrical purposes, was due in a great measure to the efforts of Mr. Hoopes. He was an expert on high voltage transmission, and put into operation many processes which made him an authority on aluminum metallurgy.

FRANCIS J. NAPOLITAN died in East Orange, N. J., Jan. 6, having gone there for radium treatment following an operation for cancer in Springfield hospital, Springfield, Mass. He was born in Bridgeport, Conn., Feb. 7, 1897, but lived most of the early years of his life in Springfield, where he was graduated from the Technical High School with honor, and entered the employ of the Cave Welding Co. He went with Mr. Cave to the Davis-Bourneville Co. of Jersey City, since taken over by the Air Reduction Sales Corp., which he served as head chemist and designer of welding equipment. He was recognized as among the most ingenious and progressive in this line and developed the "Napolitan Flux" for sheet aluminum welding for automobile body work. He also invented a bank vault composition called burglar-proof.

ADELBERT B. CHASE, treasurer of the Blair Manufacturing Co., died at his home on Robin Hill, Springfield, Mass., at the age of 71 years. Mr. Case, a prominent figure in Masonic circles, started work with the Blair company in 1880. By degrees, he worked himself up until he became treasurer and manager of the concern. He is survived by his wife and two children.

ARTHUR E. BARKER, vice-president of the Maxwell Motor Corp., Detroit, in charge of distribution of cars, died at that city last week, aged 58 years.

JAMES E. HOOD, aged 52 years, general manager of the Uintah Railway Co., died recently at Mack, Col. His death was caused by injuries received on Dec. 13. Mr. Hood was born in Meadville, Pa., and studied engineering at Allegheny College. He had been connected with the Great Northern, Erie, Chicago, Milwaukee & St. Paul, Northern Pacific and the Uintah Railway Co. of Colorado. The funeral was held at Cambridge Springs, Pa.

Death Claims W. H. Gates, Inventor

WILLIAM HERBERT GATES, vice-president and superintendent of the Eastern Machine Screw Corp., New Haven, Conn., died recently at his home in that city, after an illness of double pneumonia of a few days. He was born in Windsor, Vt., in 1867 and had been connected with the machine tool industry during all of his business life. He started to work as a milling machine hand with the Forehand Arms Co., Worcester, Mass., in 1883 and when he was nineteen years of age he was put in charge of the screw department. At the age of twenty-two years he invented his first automatic screw machine and following this other machines such as the cylinder drilling machine, rifling machine, screw slotter, and machines pertaining to revolver, gun and rifle production. Mr. Gates remained with the Forehand company and its successor, the Hopkins & Allen Co., Norwich, Conn., until 1910. During that time he designed the first magazine pistol and in 1909 he designed the automatic pistol.

William H. Gates

In May, 1910, he organized the Eastern Machine Screw Corp. and since that time had invented the H&G self-opening die head. He had to his credit a long list of inventions and perfections, among them the H&G threading machine, pin machines, castellating machines, a nine-operation automatic nipple machine and other tools.

Personals

P. KNOLL has been appointed assistant to the president of the Bucyrus Co., South Milwaukee, Wis., in charge of purchases, stores, stock control, etc., and C. A. KELLY has been named purchasing agent under Mr. Knoll.

A. A. BUEHRING will be in charge of sales in the New York district for the Dale Machinery Co., New York.

GEORGE P. HART, formerly president of the Stanley Works, New Britain, Conn., will sail Jan. 18 for a trip around the world returning to New York City May 24.

RALPH O. MULLEN has been named assistant to C. P. GUION, who is the Chicago represenative of the W. W. Sly Manufacturing Co., Cleveland, Ohio.

W. E. MACLEAN, manager of the Winnipeg office of the Combustion Engineering Corp., Ltd., has been transferred to the Toronto office of that company.

J. KAYE WOOD, formerly of the engineering department of the Western Electric Co., has accepted a position with the Westinghouse Electric & Manufacturing Co. at East Pittsburgh. He will devote most of his time to the design of spring suspension of electric railway locomotives.

E. T. WILLIAMS has been added to the present force at the Cleveland district office of the W. W. Sly Manufacturing Co., Cleveland, Ohio.

J. S. COFFIN, chairman of the board for the Lima Locomotive Works, Lima, Ohio, has been elected president, succeeding Lee G. Parish, resigned.

C. B. COLE, formerly of the Alvord Reamer & Tool Co., Millersburg, Pa., is now with the Tool Equipment Sales Co. in Chicago.

LOWELL COPELAND succeeds HARRY A. WILEY as Indiana representative of the Sullivan Machinery Co. and the Indiana office has been moved from Terre Haute to Michigan City, Ind.

CHARLES WOODWARD of the Charles Woodward Co., Cleveland, will be the speaker at the annual dinner and second annual graduation exercises of the Safety Course of Niagara Frontier Industries, under the auspices of the Industrial Safety Division of the Buffalo Chamber of Commerce.

HARRY J. KELLY, general mill superintendent of Bethlehem Steel Co., after 33 years' service with the Lackawanna plant in Buffalo, has resigned to take a more important position with the British Empire Steel Mills at Sydney, Nova Scotia, where he will be associated with GEORGE F. DOWNS, former general superintendent of the Lackawanna Steel Co.

C. M. POWER has been appointed sales manager of the Cleveland Chain & Manufacturing Co., Cleveland. Mr. Power was general sales manager of the Standard Chain Co., Pittsburgh, from 1909 to 1916, becoming sales manager of the welded chain division of the American Chain Co., Bridgeport, Conn., when the latter absorbed the Standard company. More recently he was general sales manager of the United States Chain & Forging Co., Pittsburgh.

J. W. DuB. GOULD has been appointed general manager of the Franklin Automobile Co., Syracuse, N. Y. For some time Mr. Gould has acted as consultant of the company with offices at New York. The position of general manager is newly created to relieve H. H. Franklin, president, of many of the duties of that office.

L. C. SPRAGUE has been appointed general manager of the Uintah Railway Co. with headquarters at Mack, Col., succeeding JAMES E. HOOD, deceased.

ARTHUR J. BERRY, for several years superintendent of the needle department of the New Home Sewing Machine Co., Orange, Mass., has been made factory manager of the Leavitt Machine Co. in Orange.

F. A. BICKNELL of the Bicknell-Thomas Co., machinery manufacturer, Greenfield, Mass., has sold his interest in the business, which will be conducted henceforth by L. E. TURNER, formerly of the Martin Machine Co., of Turners Falls, Mass. Mr. Bicknell formed the first-named company in 1911 with W. C. D. Thomas, whose interest he later took over. He will engage in the manufacture of special machinery.

GLENN A. WILSON has been appointed manager for the New York and New England districts for the Gibbs Instrument Co., Bay City, Mich. His headquarters will be at 120 Liberty St., New York City.

Japanese Engineers Need Technical Papers

A communication from the Institute of Electrical Engineers of Japan has just reached us in which the statement is made that the earthquake and ensuing fire destroyed much of the technical literature of the Japanese engineering societies. They are, therefore, in serious need of back copies of technical magazines of all kinds and will greatly appreciate any contributions of this nature that can be made by American firms or engineers.

The McGraw-Hill Co. has agreed to forward any material of this nature that is sent in and will, therefore, be glad to get anything that you think would be useful to the engineers of Japan. If you have something to send please address it to the secretary of the circulation board, McGraw-Hill Co., Inc., 10th Ave. at 36th St., New York City.

Copper Consumption by Motor Cars

In its annual survey of the automotive industries, made public recently, the Copper and Brass Research Association places the total 1923 consumption of copper in cars, trucks and accessories, at 170,000,000 lb. This is an increase of 61,720,000 lb. as compared with 1922 and of 90,000,000 over 1921. The copper content of the American car or truck varies all the way from 18 to 750 lb. This total consumption indicated includes not only the amount of metal carried by the finished stock car, but also the copper used in repair parts, replacements, special body work, accessories and in the increasing number of closed body models.

Final Sales of All War Stocks

A New Year's resolution of national interest comes from the War Department with the announcement that beginning at once, every effort will be made to clean up the remaining war surplus property before the close of the fiscal year which ends June 30.

The first sale of importance is to be held in Boston, Mass., Jan. 17, followed in February and March with sales at Army Depots in Brooklyn, Chicago, San Francisco and San Antonio. These sales will be Quartermaster auctions and for the major part consist of textiles, wearing apparel and general merchandise. Sales of an entirely different character are to be held shortly when certain large real estate and manufacturing plant holdings located in the United States and Canada will be sold.

During the past year the question of disposing of the remaining surplus in two or three large block sales to the highest bidders and winding up the War Department's liquidation activities at the earliest possible date, has been under consideration. This idea has been dismissed, however, as having too injurious probabilities in its effect on American industry and trade. Such a scheme was attempted by Great Britain last March, War Department officials pointed out, when the British Government, anxious to wind up its disposal campaign, offered in a single block its remaining surplus appraised at approximately fifty million dollars. The British Government received no offer which could, in the public interest, be accepted. The policy of the United States Government as regards War Department liquidation has from the outset been "one of sympathy toward its manufactories and business firms," stated a War Department official, "and to have thrown excessive stocks on the market at any one time would have incurred harsh and just criticism of our Government."

ENGLAND'S MISTAKE

It was pointed out that the British Government, faced with a more serious liquidation problem, is practically cleaned out of war surplus. War Department officials stated that this was undoubtedly due to the fact that the British Government followed a policy of disposing of its surplus property in as short a period as possible and huge blocks of classified stocks were sold at frequent periods through agencies on a commission basis. "If the comment in English trade publications is to be taken seriously," a War Department spokesman remarked, "that policy was less considerate of home manufacturing and mercantile interests than the American Government's policy. Furthermore, it must be remembered that the British Government sold its surplus to the wide, wide world, whereas the United States Government has sold to American markets only, except in cases of certain materials stored abroad, and materials, such as standard European rolling stock, for which no American market existed." The statement recently made by Charles E. Lyon, Trade Commissioner, London, bears on this situation. He stated: "In a few more months surplus war stocks of the British Government will be entirely sold or otherwise disposed of and one more feature of economic disruption resulting from the war will have been removed."

The remaining surplus of the War Department, with the exception of real estate and plant properties, is to be concentrated by samples at the larger Army depots and sold by public auction. Such depots are Boston, Brooklyn, Chicago, San Francisco and San Antonio.

Export Opportunities

The Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington, D. C., has inquiries for the agencies of machinery and machine tools. Any information desired regarding these opportunities can be secured from the above address by referring to the number following each item.

Automobile tools. Zurich, Switzerland. Agency. Reference No. 8773.

Machine tools, precision tools, measuring tools, cutting tools, cutter heads and twist drills. Zurich, Switzerland. Reference No. 8773.

Forthcoming Meetings

Gas Products Association. Tenth Mid-Winter Convention. The Blackstone Hotel, Chicago, Ill. Jan. 17, 18 and 19. C. T. Price, 140 S. Dearborn St., Chicago, Ill., secretary and treasurer.

American Society of Safety Engineers. Annual Meeting. Engineering Societies Building, 29 W. 39th St., New York City. Jan. 22.

Engineering Section of the National Safety Council. Joint meeting with the American Society of Safety Engineers. Engineering Societies Building, 29 W. 39th St., New York City. Jan. 22.

American Society for Steel Treating. Winter sectional meeting. Hotel Seneca, Rochester, N. Y., Jan. 31 and Feb. 1. W. H. Eisenman, secretary, 4600 Prospect Ave., Cleveland, Ohio.

Society of Automotive Engineers. Annual meeting, Jan. 22 to 25, at the General Motors Building, Detroit, Mich. Coker F. Clarkson, 29 W. 39th St., secretary.

American Gear Manufacturers Association. Spring Meeting, April 28, 29 and 30, 1924. Lafayette Hotel, Buffalo, N. Y. T. W. Owen, secretary, 2443 Prospect Ave., Cleveland, Ohio.

Society of Industrial Engineers. Eleventh annual convention. Buffalo, N. Y. April 30, May 1 and 2. Headquarters, 608 S. Dearborn St., Chicago, George C. Dent, executive secretary.

American Society of Mechanical Engineers. Spring meeting. Cleveland, Ohio. May 19, 20, 21 and 22. Calvin W. Rice, secretary, 29 W. 39th St., New York City.

Southern Supply & Machinery Dealers Association, National Supply & Machinery Dealers Association, and American Supply & Machinery Manufacturers Association. Triple convention, May 19, 20 and 21, 1924. Hotel Cleveland, Cleveland, Ohio. F. D. Mitchell, secretary-treasurer, 1819 Broadway, New York City.

Foreign Trade Council. Eleventh annual convention at Boston, June 4, 5 and 6. O. K. Davis, India House, Hanover Square, New York City, secretary.

The General Committee of Division V. Mechanical of the American Railway Association. Convention and exhibits. Atlantic City, June 11-18, 1924. V. R. Hawthorne, secretary, 431 S. Dearborn St., Chicago, Ill.

Railway Supply Manufacturers Association. Exhibit. Atlantic City, June 11-18, 1924.

The Lyons Fair. Lyons, France. March 3 to 17, 1924. Information furnished by Emile Garden, 50 Church St., New York City.

New and Enlarged Shops

Machine Tools Wanted

Calif., San Diego—San Diego Machine Co. (manufacturer of pumps), 745 4th St.—automatic gear cutter or hobber, also vertical boring mill.

D. C., Wash.—Southern R.R. Co., 17th St. and Pennsylvania Ave., C. R. Craig, Genl. Purch. Agt.—24 in. vertical turret lathe.

Ill., Chicago—E. Hooson, 715 West Polk St. (machine shop)—two 8 ft. lathe beds with screw and carriage.

Ill., Chicago—Machine Shop, Room 522, 716 West Madison St.—drill press, also polishing and buffing machine.

Ind., Arlington — Crimis Garage — drill press and lathe (used).

Ind., Arlington—O. F. Downey—lathe for garage (used)

Ind., Boonville—Kissel & Lutz—drill press, air compressor, grinder, small tools and equipment for garage and repair shop.

Ind., Connersville—J. C. Sherman, 6th and Central Sts.—drill press, lathe, emery stand, belting, hangers and pulleys for garage (used preferred).

Ind., Morristown—D. Walter's Garage—drill press and lathe.

Ind., Rushville—J. Gantner, West 2nd St.—pipe threader (used).

Ind., Rushville—W. McMichael, R. R. 8—drill press for machine shop

Md., Baltimore—Packard Iron & Metal Co., 921 Warner St. (machine shop and foundry), address manager — Doelger & Kirsten shear (used).

Mass., Melrose (Branch of Boston)—J. J. Lyons, 66 Summer St. (machine shop)—lathe, 14 in. swing, 6 ft. bed with equipment (used).

N. Y., Elmira—T. Briggs & Co., 413-415 East Water St.—small lathe, press and bench tools for automobile repair shop.

N. Y., New York—Janusch Mfg. Co., 290 East 135th St. (brass goods)—one screw machine, W. & F. No. 4.

N. Y., New York—Rapid Production Mfg. Co., 124 Baxter St.—one No. 1 and one No. 1½ V. and O. punch press.

N. Y., Seneca Falls—Hammer & Nearpass Sales Agency, Fall and South Walnut Sts., M. Robinson, Purch. Agt.—10 to 12 in. lathe, vise, presses, emery wheel, also berch and repair tools for garage.

O., Cincinnati—W. F. Ritter, 55 Main St.—lathe, etc., for machine shop.

O., Lakewood (Cleveland P. O.)—Marked Motor Corp., 13316 Madison Ave.—complete equipment, including tools, grinder, welder and air compressor for proposed $45,000 garage.

O., Lakewood (Cleveland P. O.)—Townsend Chevrolet Co., H. S. Wood, Genl. Mgr.—equipment, including drill press, grinder, milling machine, etc., for service station.

O., Marion—Osgood Co. (manufacturer of machinery), W. B. Long, Purch. Agt.—2,500 lb. open side type steam hammer.

O., Youngstown—McKay Machine Co., 546 Raven Ave., A. J. Waidie, Pres.—drill press, grinder and 24 in. lathe for machine shop.

Wis., Fond du Lac—Anderson Motor Co., c/o B. Anderson, 36 East 2nd St.—repair machinery, including presses, grinder and air compressor, for proposed $50,000 garage.

Wis., Menominie—E. V. Johnson—repair machinery, grinder, drill press and air tank for proposed $50,000 garage.

Wis., Milwaukee—Time-O-Stat Corp., c/o J. A. Diedrich, Sentinel Bldg. (manufacturer of mechanical devices)—buffer, drill press, etc.

Wis., Wausau—M. L. Tisch, 208 Washington St. (heating and plumbing)—one pipe cutter.

Wis., Wauwatosa—Milwaukee Airplane Co., Lisbon Rd. and Lovers Lane, R. D., G. Meissenheimer, Purch. Agt.—drill press and grinder for repair work.

Wis., West Allis—Burbach Auto Co., 5225 Greenfield Ave., P. Burbach, Purch. Agt.—automobile repair equipment, including grinder and small tools.

Wis., Wisconsin Rapids—J. E. Daly, 101 2nd St.—repair machinery and air compressor for proposed $45,000 garage.

Ont., Toronto—Bd. Educ., 155 College St.—equipment, including wood and iron lathes, drills, punches, dies, carpenter shop tools, machine tools, etc., for proposed $800,000 technical school.

Que., Montreal East—Z. St. Jean, Notre Dame St.—drill press and lathe for garage and repair shop.

Machinery Wanted

Calif., Los Angeles—City Harbor Dept., G. W. Wade, Secy., Byrne Bldg.—rail bending machine.

D. C., Wash.—A. L. Flint, Genl. Purch. Officer of Panama Canal—receiving bids until Jan. 21 for iron and steel pipe, pipe fittings, reamers, stocks, dies, tinners' shears, anvils, vises, hacksaw frames, emery wheel dressers, etc.

Ga., Atlanta—J. A. Roeblings Sons Co., 652 Walton St.—one or two 10 ton trolley cranes for proposed warehouse, about Mar. 1.

Ga., East Point—State Highway Dept., W. R. Neel, Engr.—receiving bids until Feb. 1 for one No. 7½ and one No. 5 gyratory crusher; No. 8 bucket belt elevator; 60 in. x 24 ft. revolving scalping screen; 60 in. x 14 ft. revolving sizing screen; one 24 in. x 168 ft. troughing belt conveyor for State Quarry at Oglesby.

Ill., Chicago—Printers Machinery Sales Co., 1722 West Grand Ave.—cylinder press.

Ill., Granite City—St. Louis Coke & Iron Co.—blast furnace, etc. Estimated cost $40,000.

Ind., Bigspring (Zionville P. O.)—C. C. Barker & Son—flour mill machinery, including transmission and conveying equipment, grinders, pulverizers, etc.

Ind., Bloomfield — Faucett-Vanmeter Chair Co., R. F. Parsons, Mgr.—stickers, wood turning lathes, cutoff saws, molders and wood boring machines for chair factory.

Ind., Connorsville—A. J. Deffner—Landis No. 12 shoe stitcher (used preferred).

Ind., Connersville—Ke Be Press, 109 West 5th St., C. E. Kester, Purch. Agt.—Miller feed and job printing press (used).

Ind., East Chicago—Hubbard Steel Fdry.—machinery and equipment for heating plant, also foundry equipment, to replace that which was recently destroyed by fire.

Ind., Evansville—Evansville Chair Co., 1st and Sycamore Sts., J. R. Rosenberger, Secy.—complete woodworking machinery and equipment, including belt sanders, moulders, wood turning lathe, transmission and conveying machinery.

Ind., Indianapolis — Indianapolis Furniture Co., 11th St. and Cornell Ave., L. Hallawey, Purch. Agt.—2 or 3 drum sander.

Ind., Indianapolis—W. K. Miller, 148 North Delaware St. (sand and gravel)—2 drum steam hoist.

Ind., Marion—Lindley Box & Paper Co., address, secretary—$15,000 worth of paper box making machines and equipment, to replace fire loss.

Ind., Martinsville—E. C. Martin, R. 7, Box 3—8 x 8 x 16 in. block making machine.

Ind., Muncie—Hinde Dauch Paper Co., West 25th St.—paper working machinery for proposed $65,000 factory, to replace fire loss.

Ind., Terre Haute—J. Fitzgerald Baking Co., 207 Ohio St.—mechanical baking machinery and equipment, to replace that which was destroyed by fire.

Ia., Dubuque—Carr, Ryder & Adams, 11th and Jackson Sts. (millwork and interior finish)—mortiser, sticker and planer.

Ia., Keokuk—Bd. Educ., O. S. Stanbro, Treas.—receiving bids until Feb. 7 for machinery for manual training department of high school.

Kan., Viniand—A. Schick—complete portable oil well drilling outfit, including tools, etc.

Ky., Louisville—Office of United States Engineer, P. O. Box 72—five swinging engines, 7 x 10 in. cylinder, compound geared, for derrick boats.

Mass., Clinton — Clinton Woolen & Worsted Co., address manager—looms for addition to spinning plant.

Mass., Oxford—Gordon Woolen Co., address manager—picking, carding and warping machines.

Mass., Waltham—Amer. Knitting Mills, P. N. Flynn, Mgr.—knitting machines, soon.

Mich., Detroit—H. Kline, 3137 Meldrum Ave.—nickel plating and polishing equipment.

Mich., Kalamazoo — Wolverine Casting Co.—molds, drop forge, conveying equipment, hammers, etc., for new foundry at Plainwell.

Mich., Monroe—Monroe Steel Castings Co.—machinery for proposed $50,000 factory, to replace that which was destroyed by fire.

Minn., Proctor—The Print Shop, Box 322—job printing press.

Mo., St. Louis — Banner Buggy Corp., 1615-17 North 10th St., R. L. Beall, Pres.—$15,000 worth of machinery, including planers, transmission and conveying machinery, also lathes and other woodworking machinery, for the manufacture of buggies.

N. Y., Albany—State Hospital Comn., Capitol—receiving bids until Feb. 6 for bakery equipment for Manhattan State Hospital, Ward's Island.

N. Y., Buffalo—Atlantic Bottling Wks., 90 Peckham St., T. Carrel, Purch. Agt.—machinery for the manufacture of beverages.

N. Y., Buffalo—A. D. Cutting Body Corp., 2208 Elmwood Ave.—cornice brake.

N. Y., Buffalo—R. Martin, 1405 Fillmore Ave.—machinery for the manufacture of ice cream.

N. Y., Buffalo—J. Yurewicz, 770 Seneca St.—small vise and tools for garage repair shop.

N. Y., Ray Brook—F. Erdwurn, Pres. Bd. Trustees New York State Hospital for Incipient Tuberculosis—receiving bids until Jan. 31 for refrigeration equipment for proposed 44 x 109 ft. cold storage building.

N. Y., Springville — Springville Wood Specialty Co., L. J. Cooper, Mgr.—24 or 26 in. bandsaw frame and other woodworking machinery.

N. Y., Watervliet—Stainless Products Co., Inc., Bway., A. D. Ackerman, Genl. Mgr.—drop hammer with foot control, 10 in. clearance between jaw and anvil, 1½ ton blow.

N. Y., Watervliet—C. L. Vandercook—machinery, including bandsaw, planer, nailing machine, etc., for preparing lumber and manufacturing boxes, etc.

O., Cincinnati — Southern Ry., 4th and Sycamore Sts., C. R. Craig, 13th and Penn Aves., Wash., D. C., Genl. Purch. Agt.—stickers, wood turning lathes, sanders, cutoff saws, etc., for proposed $125,000 woodworking plant at Princeton, Ind.

O., Cleveland—Freedman Bros., 705 St. Clair Ave., M. B. Freedman, Purch. Agt.—transmission and conveying machinery, cutting and sewing machines, for clothing factory.

O., Columbus—Amer. Laundry Co., 557 North 4th St., J. M. Hauck, Mgr.—five shirt ironers and one mangle.

S. D., Claremont—A. T. Cox—14 x 22 in. job printing press.

Tenn., Chattanooga—Smith Hosiery Mills, Inc., McC. Ave., G. B. Smith, Purch. Agt.—one hundred knitting machines.

Tex., Dallas—Rigsbee Electric Co., 301 North Ervay St., W. Batten, Purch. Agt.—air compressor and tank.

Tex., Galveston—Gulf, Colorado & Santa Fe Ry., 25th and B Sts., F. Merritt, Ch. Engr.—quarry equipment, crushers for ballast, etc., for quarry at Brownwood.

Va., Winchester—Natl. Fruit Product Co.—machinery for proposed pressing and drying unit, to replace that which was destroyed by fire.

The Weekly Price Guide

Rise and Fall of the Market

Iron and Steel—Pig-iron demand developing slowly; confined at present to the Northeastern states. Steel prices holding firmly to $2.40 base for bars and $2.50 per 100 lb. for plates and shapes, f.o.b. mill. Wrought steel and cast-iron pipe demand fairly active. Improvement in buying of steel sheets due mostly to automotive requirements. Business good in semi-finished steel.

Advances—Lead up $3 per ton; zinc advanced 7½c. per lb. in New York during week, although little demand has come from brass manufacturers. Tin market quiet but steady; present price level about 1c. per lb. above week ago. Market for antimony very strong; price up ⅛c. per lb. in week. Zinc sheets firmer. White and red lead advanced ¼c. per lb. from price level of July, 1923.

Declines—Copper market weak; price down ⅛c. per lb. since first of the year. Old brass and copper prices tending downward.

IRON AND STEEL

PIG IRON—Per gross ton—Quotations compiled by The Matthew Addy Co.:

CINCINNATI	
No. 2 Southern	$25.05
Northern Basic	24.00
Southern Ohio No. 2	24.00
NEW YORK—Tidewater Delivery	
Southern No. 2 (silicon 2.25@2.75)	28.00
BIRMINGHAM	
No. 2 Foundry	22.00
PHILADELPHIA	
Eastern Pa., No. 2x (silicon 2.25@2.75)	24.25
Virginia No. 2	28.17
Basic	24.00
Grey Forge	24.00
CHICAGO	
No. 2 Foundry local	24.50
No. 2 Foundry, Southern (silicon 2.25@2.75)	27.00
PITTSBURGH, including freight charge from Valley	
No. 2 Foundry	25.77
Basic	25.77
Bessemer	26.77

IRON MACHINERY CASTINGS—Cost in cents per lb. of 100 flywheels, 6-in. face x 24-in. dia., hub not cored, good quality gray iron, weight 275 lb.:

Detroit	4.75
Cleveland	4.75
Cincinnati	5.00@7.50
New York	5.00@5.50
Chicago	5.25@5.75

SHEETS—Quotations are in cents per pound in various cities from warehouse; also the mill base in large lots.

Blue Annealed	Pittsburgh	New York	Cleveland	Chicago
No. 10	3.00	4.34	3.75	4.00
No. 12	3.10	4.39	3.80	4.05
No. 14	3.20	4.44	3.85	4.10
No. 16	3.40	4.54	3.95	4.20
Black				
Nos. 17 and 21	3.70	4.55	4.45	4.70
Nos. 22 and 24	3.75	4.60	4.50	4.70
Nos. 25 and 26	3.80	4.65	4.55	4.75
No. 28	3.85	4.75	4.65	4.85
Galvanized				
Nos. 10 and 11	3.90@4.00	4.80	4.70	4.85
Nos. 12 and 14	4.00@4.10	4.90	4.80	4.95
Nos. 17 and 21	4.30@4.40	5.20	5.10	5.24
Nos. 22 and 24	4.45@4.55	5.35	5.25	5.40
No. 26	4.60@4.70	5.45	5.50	5.55
No. 28	4.90@5.00	5.75	5.80	5.85

WROUGHT PIPE (Welded)—Warehouse discounts are as follows:

	New York		Cleveland		Chicago	
	Black	Galv.	Black	Galv.	Black	Galv.
1 to 3 in. steel butt welded	48%	34%	55½%	43½%	50%	37%
2½ to 6 in. steel lap welded	44%	30%	53½%	40½%	47%	34%

Malleable fittings: Classes B and C, banded, from New York stock sell at list plus 4%; class A, plus 23%. Cast iron, standard sizes, 34% off.

SEAMLESS STEEL TUBING—Following base discounts are on 20 gauge or .035-in., round, cold-drawn tubing, ½-in. to 1-in., O.D., weighing 0.17 lb. to 0.36 lb. per ft. Cutting charge per 100 cuts, $1.50 to $1.58:

O.D. Inches	List Price per ft.	Differential Discount	O.D. Inches	List Price per ft.	Differential Discount
½	$0.09	50%	⅞	$0.16	35%
⅝	.11	45%	1	.18	31%
¾	.14	40%			

NOTE—The discounts are to be lowered by the following differentials in the case of regular .10-.20 carbon: 25,000 ft. or over, 83; 15,000 to 25,000 ft., 82; 5,000 to 15,000 ft., 81; 1,000 to 5,000 ft., 80; less than 1,000 ft., 79.

MISCELLANEOUS—Warehouse prices in cents per pound in 100-lb. lots:

	New York	Cleveland	Chicago
Open hearth spring steel (base)	4.50	6.00	4.20
Spring steel (light) (base)	7.00	6.00	6.00
Coppered Bessemer rods (base)	6.53	8.00	6.70
Hoop steel	5.19	4.66	4.55
Cold rolled strip steel	7.50	8.25	8.35
Floor plates	5.80	5.66	5.80
Cold drawn shafting or screw	4.40	3.90	4.30
Cold drawn flats, squares	4.90	4.40	4.80
Structural shapes (base)	3.64	3.46	3.30
Soft steel bars (base)	3.54	3.36	3.20
Soft steel bar shapes (base)	3.54	3.36	3.20
Soft steel bands (base)	4.39	3.61	3.95
Tank plates (base)	3.64	3.46	3.30
Bar iron (3.10@3.15 at mill)	3.54	3.36	3.20
Tool steel	11.00	.....	.....
Drill rod (from list)	55%	40@55%	50%

Electric welding wire, New York, 3/32, 8.35c.; ⅛, 7.85c.; 5/32 to ¼, 7.35c. per lb.

METALS

Current Prices in Cents Per Pound

Copper, electrolytic (up to carlots), New York			13.25
Tin, 5-ton lots, New York			49.12½
Lead (up to carlots), St. Louis	8.25	New York	8.87½
Zinc (up to carlots), St. Louis	6.37½	New York	6.82½

	New York	Cleveland	Chicago
Aluminum, 98 to 99% ingots, 1-15 ton lots	25.20	27.00	28.50
Antimony (Chinese), ton spot	11.50	11.50	10.25
Copper sheets, base	20.50	21.00@21.25	23.00
Copper wire, base	16.00	19.00	16.25
Copper bars, base	19.50	22.50	19.50
Copper tubing, base	22.50	27.25	23.00
Brass sheets, base	17.25	22.00	18.75
Brass tubing, base	21.50	27.00	20.50
Brass rods, base	15.00	18.00	15.75
Brass wire, base	17.75	22.00	.....
Zinc sheets (casks)	10.50	10.45	.....
Solder (½ and ½), (case lots)	33.75	31.75	30.00
Babbitt metal (83% tin)	52.00	60.00	48@52
Babbitt metal (35% tin)	25.00	20.00	22@25
Nickel (ingot and shot)	29.00	.....	.....
Nickel (electrolytic)	32.00	.....	35.00

SPECIAL NICKEL AND ALLOYS—Price in cents per lb.

Malleable nickel sheet (base)	57.00
Hot rolled rods, Grade "A" (base)	55.00
Cold drawn rods, Grade "A" (base)	63.00

Shop Materials and Supplies

METALS—Continued

Copper nickel ingots	37.00
Hot rolled copper nickel rods (base)	45.00
Manganese nickel hot rolled rods "E"—low manganese (base)	57.00
Manganese nickel hot rolled rods "D"—high manganese (base)	60.00

Base price of monel metal in cents per lb., f.o.b. Huntington, W. Va.:

Shot	32.00	Hot rolled rods (base)	40.00
Blocks	32.00	Cold drawn rods (base)	48.00
Ingots	38.00	Hot rolled sheets (base)	42.00

OLD METALS—Dealers' purchasing prices in cents per pound:

	New York	Cleveland	Chicago
Copper, heavy, and crucible	11.75	10.75	11.50
Copper, heavy, and wire	10.75	10.25	10.75
Copper, light, and bottoms	9.50	8.50	9.75
Lead, heavy	5.75	6.50	6.00
Lead, tea	4.75	4.00	5.00
Brass, heavy, yellow	7.00	.....	7.25
Brass, heavy, red	8.75	9.25	9.00
Brass, light	6.25	4.75	6.25
No. 1 yellow brass turnings	7.00	5.75	6.75
Zinc	3.75	2.75	3.75

TIN PLATES—American Charcoal—Bright—Per box.

		New York	Cleveland	Chicago
"AAA" Grade:				
IC,	20x28, 112 sheets	$25.10	$22.85	$18.50
"A" Grade:				
IC,	20x28, 112 sheets	21.40	18.00	17.00
	Coke Plates—Primes, 20x28 in.			
100-lb.,	112 sheets	14.00	13.00	14.50
	Terne Plates—Small lots, 8-lb. Coating			
IC,	14x20	8.25	6.55	7.40

MISCELLANEOUS

	New York	Cleveland	Chicago
Cotton waste, white, per lb.	$0.11@0.14	$0.15	$0.14
Cotton waste, colored, per lb.	.09@.14	.12	.10½
Wiping cloths, 13¼x13¼, per lb	10.50	36.00 per M	.16
Wiping cloths, 13¼x20½, per lb.	11.00	52.00 per M	.16
Sal soda, per 100 lb.	2.40	2.25	2.65
Roll sulphur, per 100 lb.	3.60	3.25	3.50
Linseed oil, per gal., 5 bbl. lots	.94	1.00	.94
Lard cutting oil, 25% lard, per gal.	.55	.50	.67½
Lard oil, pure, per gal, 2 to 5 bbl. lots	.76	.73	.71
Machine lubricant, medium-bodied (50 gal. wooden bbl.), per gal.	.29	.35	.40
Belting—Present discounts from list in fair quantities (½ doz. rolls).			
Leather—List price, 2c. per sq.in., per ply:			
Medium grade	40–2½%	30–10%	30–10%
Heavy grade	30–5%	30%	20–5–2½%
Rubber and duck:			
First grade	50–10–5%	50–10%	40–10%
Second grade	60–5%	60–5%	60–5%
Abrasive materials—In sheets 9x11 in.,			
No. 1 grade, per ream of 480 sheets:			
Flint paper	$6.30	$5.84	$6.48
Emery paper	9.90	11.00	8.80
Emery cloth	31.12	31.12	29.48
Emery disks, 6 in. dia., No. 1 grade, per 100:			
Paper	1.49	1.24	1.40
Cloth	3.38	2.67	3.20
Fire clay, per 100 lb. bag	.....	.65	.60
Coke, prompt furnace, Connellsville	per net ton		3.75@4.00
Coke, prompt foundry, Connellsville	per net ton		5.00@6.50
White lead, dry or in oil	100 lb. kegs		New York, 14.25
Red lead, dry	100 lb. kegs		New York, 14.25
Red lead, in oil	100 lb. kegs		New York, 15.75

Comparative Warehouse Prices

New York	Unit	Current Price	Four Weeks Ago	One Year Ago
Soft steel bars	per lb.	$0.0354	$0.0354	$0.0304
Cold finished shafting	per lb.	0.044	0.044	0.039
Brass rods	per lb	0.155	0.155	0.17
Solder (½ and ½)	per lb.	0.3375	0.3375	0.28
Cotton waste	per lb.	.11@.14	.11@.14	0.11½
Washers, cast iron (½ in.)	per 100 lb.	6.50	6.50	6.00
Emery, disks, cloth, No. 1, 6 in. dia.	per 100	3.38	3.38	3.02
Lard cutting oil	per gal.	0.55	0.55	0.50
Machine oil	per gal.	0.29	0.297	0.33
Belting, leather, medium	off list	40–2½%	30–10%	30–10%
Machine bolts up to 1x30 in.	off list	45%	45%	40%

SHOP SUPPLIES

Current Discounts from Standard Lists

	New York	Cleveland	Chicago
Machine Bolts:			
All sizes up to 1x30 in.	45%	60%	50–5%
1¼ and 1¼x3 in. up to 12 in	15%	50–5%	50%
With cold punched hex. nuts up to 1 in. diam. (plus std. extra of 10%)	30%	$3.50 net	.....
With hot pressed hex. nuts up to 1x30 in. (plus std. extra of 10%)	35%	3.50 net	$4.00 off
Button head bolts, with hex. nuts	List net	List net	.....
Hex. head and hex. nut bolts	List net	.....	65–5%
Lag screws, coach screws	45%	.....	60–5%
Square and hex. head cap screws	60%	70%	70–10%
Carriage bolts, up to 1 in.x30 in.	35%	50%	50–5%
Bolt ends, with hot pressed nuts	45%	.....	55%
Tap bolts, hex. head, list plus	35%	.....	.....
Semi-finished nuts, 5/16 and smaller	65%	.....	.....
Semi-finished nuts, ⅜ and larger	60%	70%	80%
Case-hardened nuts	50%	.....	.....
Washers, cast iron, ½ in., per 100 lb. (net)	$6.50	$4.00	$4.00
Washers, cast iron, ⅝ in., per 100 lb. (net)	5.50	4.00	4.00
Washers, round plate, per 100 lb. Off list	1.50	4.00	4.00
Nuts, hot pressed, sq., per 100 lb. Off list	1.00	3.50	3.50
Nuts, hot pressed, hex., per 100 lb. Off list	1.00	3.50	3.50
Nuts, cold punched, sq., per 100 lb. Off list	1.00	3.50	3.50
Nuts, cold punched, hex., per 100 lb. Off list	1.00	3.50	3.50
Rivets:			
Rivets, 7/16 in. dia. and smaller	50%	60%	60%
Rivets, tinned	50%	60%	4½c. net
Button heads ¾-in., ⅞-in., 1x2 in. to 5 in., per 100 lb. (net)	$5.00	$3.60	$3.75
Cone heads, ditto (net)	5.20	3.80	3.85
1½ to 2-in. long, all diameters, *EXTRA* per 100 lb.	0.25	.....	0.15
⅝ in. diameter *EXTRA*	0.35	.....	0.15
½ in. diameter. *EXTRA*	0.75	.....	0.50
1 in. long, and shorter *EXTRA*	0.75	.....	0.50
Longer than 5 in. *EXTRA*	0.50	.....	0.25
Less than 200 lb. *EXTRA*	0.50	.....	0.50
Countersunk heads *EXTRA*	0.45	.....	$3.70 base

Wash., Ranier—Gruber & Docherty Lumber Co.—sawmill equipment, including log-saw, belting, hangers and shafting.

Wis., Crandon—J. J. Hoenke—woodworking machinery, including saws.

Wis., Cumberland—Cumberland Co-operative Creamery Co., W. N. Hedbech, Secy. —power churn, separator, belting and shafting.

Wis., Manitowoc—J. Weiers, 17th and Washington Sts.—woodworking machinery, including boring machines for proposed $40,000 factory.

Wis., Milwaukee—Badger Dye Wks., 887 3rd St.—equipment and vats for proposed $40,000 addition to dye works.

Wis., Milwaukee—Bartles-Maguire Oil Co., 539 Bway.—air compressor outfit, gasoline pumps and tanks for proposed $100,000 service station.

Wis., Milwaukee—Bd. Public Wks., City Hall, R. E. Stoelting, Comr.—one large electrically driven air compressor.

Wis., Milwaukee—Federal Pressed Steel Co., 52 Keefe Ave.—enameling oven and equipment.

Wis., Milwaukee—Genl. Lumber Co., 425 East Water St., H. Christiansen, Purch. Agt.—shingle mill and planer.

Wis., Milwaukee—J. Henry, 821 St. Paul Ave. (iron works)—traveling crane, about 5 ton (used preferred).

Wis., Milwaukee—Hercules Oil Co., 1322 Green Bay Ave., H. Schmidt, Purch. Agt.—one large air compressor, gasoline storage tanks and pumps.

Wis., Milwaukee—Mertis Mchy. Co., 246 Oregon St.—400 to 500 ft., 2 stage air compressor.

Wis., Milwaukee—Milwaukee Structural Steel Co., 19th St. and St. Paul Ave.—crane and hoist for Wauwatosa plant.

Wis., Milwaukee—Office of United States Engineer, Federal Bldg.—receiving bids until Jan. 22 for one revolving steel crane.

Wis., Milwaukee—Werner Knitting Co., 397 11th Ave., S. Schiveder, Purch. Agt.—looping and shaping machines.

Wis., New London—School Bd., R. J. McMahon, Supt.—manual training machinery and equipment.

Wis., Oshkosh—Levisee Lumber Co., Old Commercial Bank Bldg., A. L. Osborn, Purch. Agt.—bandsaw mill, belting and shafting.

B. C., Vancouver—Granby Consolidated Mining, Smelting & Power Co., Ltd., Berks Bldg., K. Roem, Purch. Agt.—machinery, tools and equipment.

B. C., Vancouver—J. B. Mathers & Sons, 517 Pender St., W.—lathe, circular resaw, hand gummer, shingle machine, fifty ton 20 lb. rails, shaving blower, belting, shafting and 6 x 40 in. edger with coast set works.

Ont., Alexandria—Alexandria Central Garage, W. A. Brenie, Purch. Agt.—battery and welding equipment.

Ont., Copper Cliff—W. Koivula, 5 Poplar St.—bakery equipment.

Ont., Copper Cliff—W. A. Lytle, 93 Balsam St.—emery grinder, stand and bench tools for blacksmith shop.

Ont., Dundas—Kaustine Mfg. Co., Ltd., J. F. Crowley, Purch. Agt.—machinery and equipment for the manufacture of sewage disposal equipment, tanks, containers, heating systems, etc.

Ont., Farrelton—M. J. Hendrick—planing mill machinery.

Ont., Kingston—R. J. McClelland—equipment for the manufacture of cement blocks, bricks, lintels, cement tile, etc.

Ont., Massey—J. H. Whalen—forge and general equipment for blacksmith shop.

Ont, Moose Creek—F. Ouderkirk—vise, tools, forge, etc., for blacksmith shop.

Ont., North Bay—A. A. Johnston, 330 McIntyre St. (cabinet maker)—planer and matcher.

Ont., Richmond Hill—J. H. Yates—complete equipment for new tannery.

Ont., Sudbury—J. V. Kannacto—newspaper press, belting, etc.

Que., Aylmer—R. Metcalfe—stitcher for shoe repairs.

Que., Montreal—G. E. Barre, 405 Montcalme St. (cabinet maker)—planer and possibly sander.

Que., Montreal—S. R. Brouneau, P. O. Box 214 — stitching machine for book binding.

Que., Montreal — La Confiserie Mount Royal, Ltd., 658 Mt. Royal Ave., E.—equipment for candy plant.

Que., Montreal—C. A. Mouneau, 966 Papineau Ave. — candy manufacturing equipment.

Que., Montreal—S. Share, 366 St. George St.—job press and feeder.

Que., Montreal — J. Taylor, 861 St. Catherine St., W.—wood lathe and joiner for cabinet making.

Que., Montreal — N. W. Wolf, 626 St. Catherine St., W.—job printing press, paper cutter, etc.

Que., Pointe aux Trembles—J. Dulude—mixer and sifter for bakery.

Que., Pointe aux Trembles—D. Guay—equipment for bakery.

Que., Vaudreuil—J Juillet & Fils—sawmill machinery

Que., Vaudreuil—F. X. St. Denis—equipment for bakery.

Que., Westmount—A. Buchanan, 55 Selby Ave. (dairy)—pasteurization equipment.

Alaska, Ketchikan—Supt. of Lighthouses—receiving bids until Feb. 12 for one 30 hp. gasoline hoist, 2 drum, with derrick swinging gear and one stiff leg derrick for light station.

Metal Working Shops

Ala., Birmingham—The Southern Ry. Co., 13th St. and Pennsylvania Ave., Wash., D. C., awarded the contract for the construction of additions to shops, including locomotive repair shops, boiler and smith shop, car repair sheds, mill shop, etc., here. Noted Nov. 22.

Calif., Auburn—The Central Calif. Corp. awarded the contract for the construction of a 1 story garage on High St. Estimated cost $42,000. V. M. Ford, Auburn, Lessee.

Calif., Fullerton—The Balboa Motor Corp. is having plans prepared for the construction of a factory, including 80 x 100 ft. office building, 168 x 280 ft. main factory, 84 x 150 ft. paint shop and a 48 x 150 ft. repair shop. Hamm & Grant, Ferguson Bldg., Los Angeles, Archts.

Calif., Long Beach—The City Transfer & Storage Co., 134 Pacific Ave., will build a 1 story, 100 x 180 ft. garage on 5th St.

Calif., Long Beach—L. Y. Cooper, 503 East Ocean Ave., awarded the contract for the construction of a 1 story, 100 x 150 ft. garage on Linden Ave.

Calif., Los Angeles—H. H. Cotton, Merchants Natl. Bank Bldg., awarded the contract for the construction of a 1 and 2 story garage on 20th and Figueroa Sts. Estimated cost $45,000.

Calif., Los Angeles—Gilbert & Cole, c/o V. P. Gilbert, Contr., Citizens Natl. Bank Bldg., awarded the contract for the construction of a 1 story, 80 x 280 ft. garage on Imperial St. and Santa Fe Ave.

Calif., Los Angeles—W. B. Merwin, H. W. Hellman Bldg., awarded the contract for the construction of a 1 story, 100 x 150 ft. garage on North Western Ave.

Calif., Pasadena—F. W. Alden, 425 North Raymond Ave., will build a 1 story, 75 x 150 ft. garage on Fair Oaks Ave.

Conn., Bridgeport—The A. L. Clark Co., 1710 Main St., awarded the contract for the construction of a 1 and 2 story, 100 x 298 ft. service station, garage and sales room on Fairfield Ave. Estimated cost $150,000. Noted Dec. 20.

Conn., New Britain—The Hart & Cooley Co., Corbin Ave., manufacturer of warm air registers, awarded the contract for the construction of a 2 story, 60 x 75 ft. factory. Estimated cost $40,000.

Conn., Oakville — Fletcher-Thompson, Inc., Engrs. and Archts., 542 Fairfield Ave., Bridgeport, receiving bids for the construction of a 4 story, 60 x 138 ft. addition to wire goods factory for the Autoyre Co., here. Estimated cost $100,000.

Conn., Stamford—The New York, New Haven & Hartford R.R., New Haven, is having plans prepared for the construction of a 1 story sheet metal repair shed, here. Estimated cost $60,000. E. Gagel, Ch. Engr.

Conn., Torrington—The Fitzgerald Mfg. Co., North Main St., sheet metal, is having plans prepared for the construction of a 2 story, 110 x 200 ft. factory. Estimated cost $70,000. Private plans.

Ill., Duquoin—The Sims Motor Car Co., 19 North Division St., is receiving bids for the construction of a 1 story, 100 x 175 ft. garage. Estimated cost $40,000. T. S. Thompson, 1000 South 10th St., Carbondale, Archt.

Ill., Maywood—W. A. Kennedy, c/o Van Gunten & Van Gunten, Archts., 26 East Huron St., Chicago, awarded the contract for the construction of a 2 story, 75 x 175 ft. machine and pattern shop on 1st Ave. and 1st St., here. Estimated cost $40,000. Noted Nov. 1.

Ind., Peru—The Wabash R.R., Division Headquarters, plans to spend $1,000,000 for improvements, including construction of car and locomotive repair shops, etc., east of here. R. H. Howard, Ry. Exch. Bldg., St. Louis, Mo., Ch. Engr.

Mich., Monroe—The Monroe Steel Castings Co. plans to rebuild its factory, which was recently destroyed by fire. Estimated cost $50,000. Engineer or architect not announced.

Mo., St. Louis—L. B. Pfrimmer, 1645 South Grand Blvd., awarded the contract for the construction of a 1 story, 75 x 140 ft. garage. Estimated cost $45,000.

Mo., St. Louis—A. A. Wagner, 901 Century Bldg., will build a 2 story, 103 x 281 ft. garage on Delmar St. Estimated cost $150,000.

Neb., Omaha — I. Goldstein, 218 South 18th St., awarded the contract for the construction of a 3 story, 80 x 119 ft. garage on 19th and Capitol Sts. Estimated cost $100,000. Noted Nov. 8.

N. Y., Buffalo — The Postal Terminal Bldg. Co. and Fletcher Amer. Co., Amer. Natl. Bank Bldg., Indianapolis, Ind., awarded the contract for the construction of a 2 story, 115 x 300 ft. postal substation and garage building on Swan St. from Oak to Elm Sts., here. Estimated cost $525,000.

N. Y., Lackawanna (Buffalo P. O.)—J. W. O'Connor plans to build a 2 story, 150 x 200 ft. garage on Ridge Rd. Estimated cost $50,000.

N. Y., New York—A. B. Fleck, c/o Connova & Viviani, Engrs., 145 West 41st St., awarded the contract for the construction of a 2 story, 100 x 360 ft. garage on 91st St. and 1st Ave. Estimated cost $500,000.

N. Y., New York—The Keystone Properties Corp., 27 Cedar St., will build a 5 story, 100 x 100 ft. garage at 107-115 West 89th St. Estimated cost $200,000. E. Doeis, Secy.

N. Y., North Tonawanda—The Kardex Co., Main St., manufacturer of filing systems, awarded the contract for the construction of a 1 story, 100 x 600 ft. factory. Estimated cost $200,000.

O., Cleveland—The Frankelite Co., c/o D. Frankel, Vice Pres., 5016 Woodland Ave., manufacturer of electrical fixtures, is having plans prepared for the construction of a 3 story, 56 x 130 ft. factory and warehouse on East 51st St. Estimated cost $75,000. A. Sogg, 319 Hippodrome Bldg., Cleveland, Archt.

O., Cleveland—The Genl. Power Constr. Co., 1603 East 27th St., electrical contractor, has had plans prepared for the construction of a 1 story, 60 x 87 ft. factory and warehouse. Estimated cost $40,000. W. E. Milestone, Pres. Hadlow, Hick & Co., Finance Bldg., Cleveland, Archts.

Pa., Phila.—F. & F. Bedell, 223 North 16th St., awarded the contract for the construction of a 1 story, 47 x 75 ft. machine shop at 762-764 North Uber St. Estimated cost $13,600.

R. I., Pawtucket—The Pressed Metal Co. awarded the contract for the construction of a 1 story, 110 x 265 ft. factory for the manufacture of automobile parts on Campbell St. Estimated cost $115,000. D. W. Flint, Cranston (Providence P. O.), interested in company.

Tenn., Chattanooga—The Citizens Automobile Co., 7th and Broad Sts., awarded the contract for the construction of a 1 story garage. Estimated cost $40,000.

Tenn., Nashville — The Gray & Dudley Co., 222 3rd Ave., N., plans to build an addition to its foundry. Estimated cost $50,000.

Tex., Dallas—The Gulberson Corp., Pennsylvania St., plans to build a plant for the manufacture of oil well machinery on Forest Ave. along tracks of the Missouri, Kansas & Texas R.R. Estimated cost $50,000.

W. Va., Fairmont—The Central Automobile Corp. awarded the contract for the construction of a 3 story, 100 x 120 ft. salesroom and garage on 4th St. Estimated cost $75,000.

Wis., Milwaukee—The Byrne Bros. Co., 3112 Burleigh St., will build a 1 story, 107 x 120 ft. garage on North Ave. Estimated cost $50,000.

Wis., Milwaukee — The Milwaukee Air Power Pump Co., 8 Keefe Ave., is having plans prepared for the construction of a 1 story, 40 x 62 ft. addition to its factory. Estimated cost $40,000. Erich Schroeder Co., 405 Bway., Engrs. and Archts.

Wis., Racine—The Belle City Malleable Iron Co., Kewaunee St., is having plans prepared for 1 story, 117 x 300 ft. second unit of foundry. P. M. Adams, c/o owner, Archt.

Ont., Toronto—The city is having plans prepared for the construction of a 2 story garage on River St. Estimated cost $100,000. G. W. F. Price, City Hall, Archt.